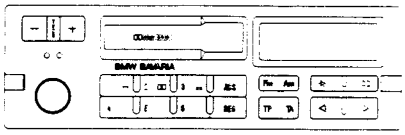
PIONEER
The Art of Entertainment

Service Manual



ORDER NO.
CRT1413

BMW ANTI-THEFT CD-READY RADIO

KE-92ZBM EW

Model	BMW No.
KE-92ZBM/EW	65 12 8 357 037

Note:
- **See the service manual CX-175 (CRT1276) for the cassette mechanism description.**
- **Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.**

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FK AUG. 1991 Printed in Japan

1. SPECIFICATIONS

TUNER

FM Receiver

Usable Sensitivity (Load) [30dB(N + D)/(S + N + D)]	1 μV
Signal/Noise Ratio (1 mV)	65 dB
Overload Signal	1V
AM Rejection	40 dB
IF Rejection	110 dB
Image Rejection	60 dB
Spurious Rejection	70 dB
Alternate Channel Selectivity	60 dB
Capture Ratio	2 dB
Stereo Separation (1 kHz)	40 dB
Stereo Distortion (1 mV)	0.5 %
Frequency Range	87.5 to 108.0 MHz
Intermediate Frequency	10.7 MHz

AM Receiver (MW SECTION)

Usable Sensitivity [20 dB N/ (S + N)]	20μV
Signal/Noise Ratio (5 mV)	50 dB
Selectivity (± 9 kHz)	100 dB
IF Rejection	100 dB
Image Rejection	60 dB
Distortioin (5 mV RF)	0.5 %
Frequency Range	531 to 1602 kHz
Intermediate Frequency	1st : 10.71 MHz, 2nd : 450 kHz

AM Receiver(LW SECTION)

Useble Sensitivity [20 dB N/(S + N)]	20 μV
Signal/Noise Ratio (5 mV)	50 dB
Image Rejection	90 dB
Frequency Range	153 to 279 kHz
Intermediate Frequency	1st : 10.71 MHz, 2nd : 450 kHz

CASSETTE DECK

Wow and flutter WRMS-JIS	0.07 %
Signal/Noise Ratio	50 dB
Dolby NR B Effect	10 dB
Dolbny NR C Effect	19 dB
Separation	50 dB
Cross Talk	50 dB
Distortion	55 dB
Frequency Response (− 3 dB)	
Normal	40 Hz to 15 kHz
Metal	40 Hz to 18 kHz

AUDIO CONTROL

Tone Control Response	
Treble Boost/Cut 10 kHz	± 12 dB
Bass Boost/Cut 100 Hz	± 12 dB

POWER AMPLIFIER

Power Output ($R_L = 4\,\Omega$, Vcc = 14.4V)	5.5W/Ch
10 % THD	4.5W/Ch
1 % THD	
THD ($R_L = 4\,\Omega$, Vcc = 14.4V) Po = 1W	0.05 %
Frequency Response (± 3 dB)	20 Hz to 40 kHz
Signal/Noise Ratio	65 dB

2. DISASSEMBLY

● Case Unit

1. Remove the screw.
2. Insert and turn a flat screwdriver.
3. Raise case unit to remove.

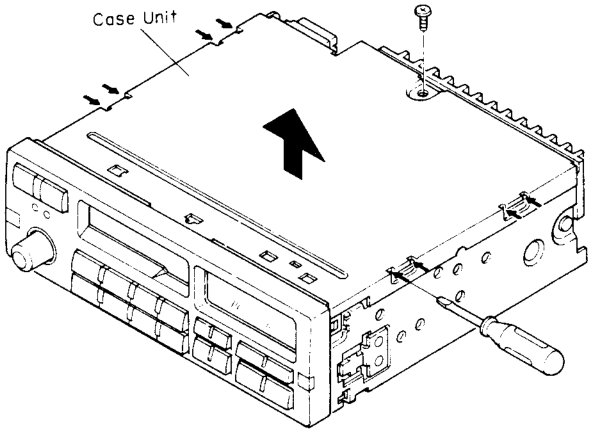


Fig. 1

● Cassette Mechanism Assy

1. Remove four screws.
2. Disconnect connector, and then raise cassette mechanism assy to remove.

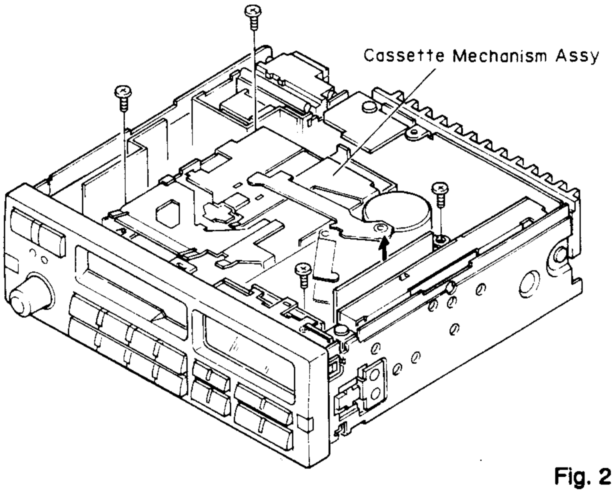

Cassette Mechanism Assy

Fig. 2

● Grille Assy

1. Disconnect connector.
2. Press tabs at five locations indicated by arrows, and pull out grille assy.

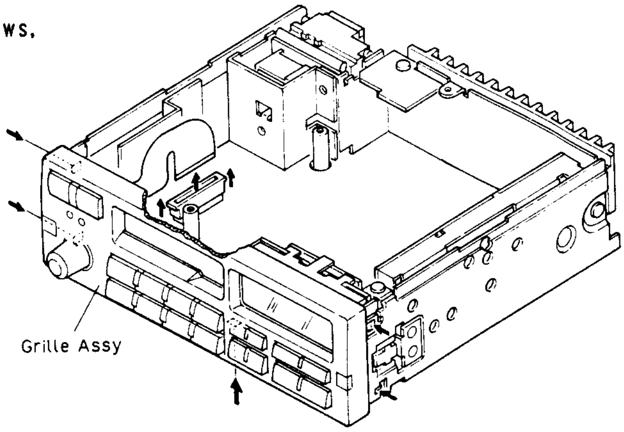

Grille Assy

Fig. 3

● Chassis Assy

1. Remove six screws.
2. Raise up on tuner amp unit to remove it from chassis assy.

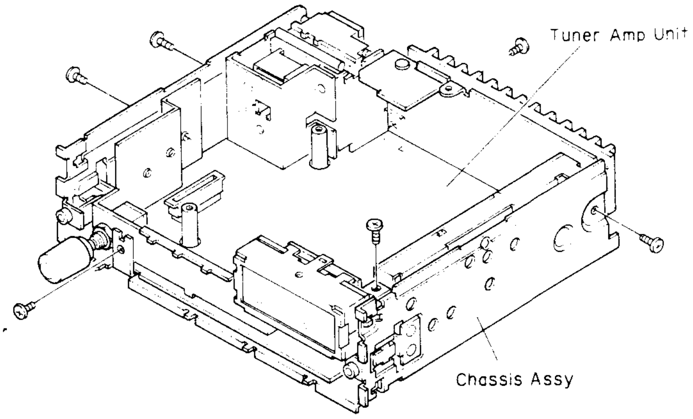

Tuner Amp Unit
Chassis Assy

Fig. 4

● Key Board Unit

1. Remove the solder at location indicated by white arrow.
2. Press tabs at two locations indicated by black arrows.
3. Remove four screws, and then raise key board unit.

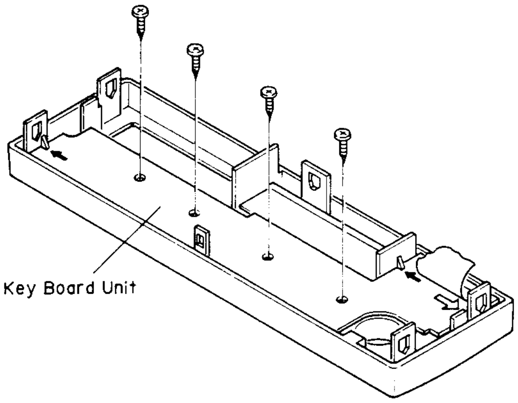
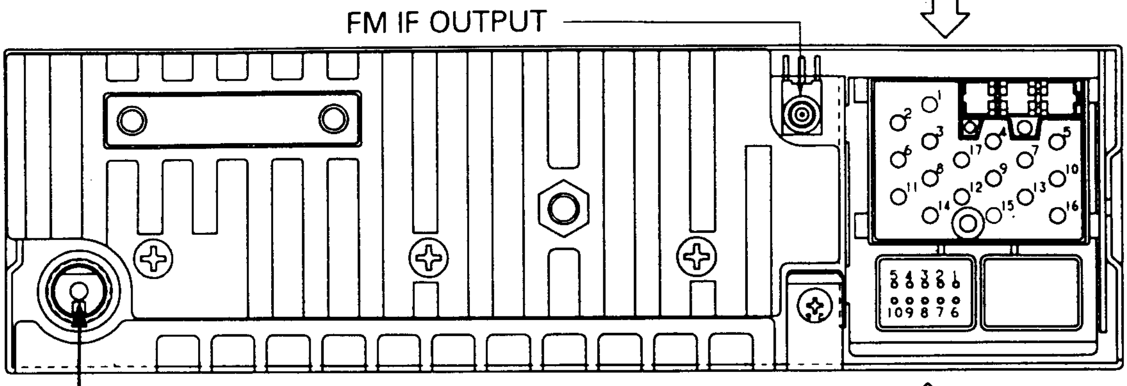

Key Board Unit

Fig. 5

3. CONNECTOR FUNCTION DESCRIPTION

1	FRONT Lch+ OUTPUT	10	GAL CONTROL IN
2	FRONT Rch+ OUTPUT	11	FRONT Rch- OUTPUT
3	REAR Lch+ OUTPUT	12	REAR Lch- OUTPUT
4	TEL MUTE	13	ILL IN
5	ACC	14	REAR Rch- OUTPUT
6	REAR Rch+ OUTPUT	15	GND
7	NC	16	AUTO ANTENNA
8	FRONT Lch- OUTPUT	17	LAC
9	BACK UP		



1	DATA	6	CLK
2	RXEN	7	RST
3	D.GND	8	GND
4	CD Rch GND	9	CD Rch INPUT
5	CD Lch GND	10	CD Lch INPUT

Fig. 6

4. ANTI-THEFT

Your BMW radio will not operate once it is removed from the console, making it virtually useless to a thief. The only way to restore power to the radio once it is removed is to enter a four-digit security code unique to your radio. The anti-theft features of your radio operate as follows :

1. When the ignition key is removed, the red anti-theft LED indicator will flash continuously.

2. A dead battery, electrical repairs, radio removal or reduction of voltage supply to less than a preset value will render the radio inoperable until voltage is restored and the security code is entered. The radio must be turned on before the code is entered. The word "CODE" will show on the display.

3. To enter your security code, which can be found on the card supplied to you by BMW, turn the radio on and PRESET Buttons 1 thru 4 are related to each component of a secret code. Every time when a button is pressed, the related numerical value will increment. After setting all of the four digits, press the UP ">" button and the secret code will be entered. If it is found correct, the system will turn ready to operate.

   If the correct code is not entered in three successive tries, the radio will not accept another entry until it has been left on for one hour.

4. Do not leave the code cards in your car. Place them in your wallet or with your vehicle title papers for security. If you lose the code cards, contact the nearest BMW dealer. He will get your code from BMW. There may be a charge for removing the radio to ascertain its chassis number.

5. If radio or electrical repairs become necessary, please give the repair facility your radio code number. If you do not, only authorized BMW personnel can obtain the code from BMW.

WARNING: FOR YOUR PROTECTION, CODES WILL **NOT** BE GIVEN OUT TO ANYONE-UNDER ANY CIRCUMSTANCES - EXCEPT AUTHORIZED BMW DEALER PERSONNEL AFTER PROOF OF VEHICLE OWNERSHIP AND PROPER IDENTIFICATION IS ESTABLISHED.

5. USING THE RADIO

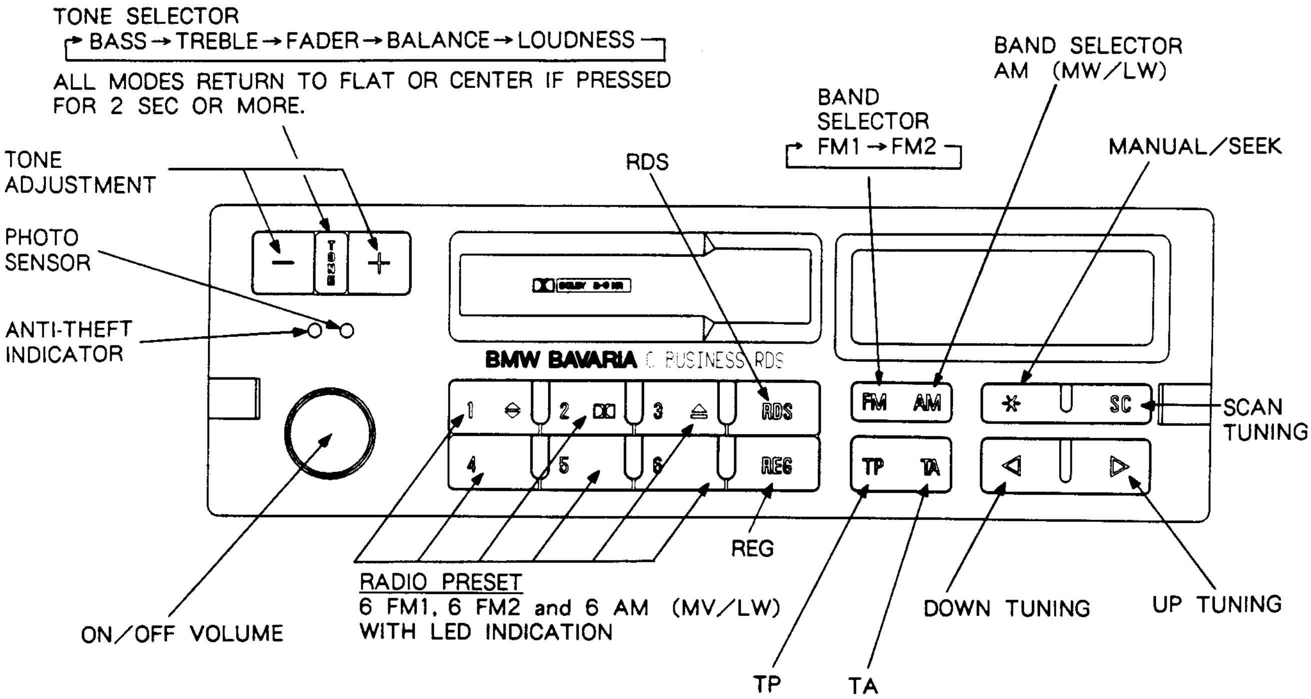

TONE SELECTOR
BASS → TREBLE → FADER → BALANCE → LOUDNESS
ALL MODES RETURN TO FLAT OR CENTER IF PRESSED FOR 2 SEC OR MORE.
TONE ADJUSTMENT
PHOTO SENSOR
ANTI-THEFT INDICATOR
RDS
BAND SELECTOR FM1 → FM2
BAND SELECTOR AM (MW/LW)
MANUAL/SEEK
SCAN TUNING
BMW BAVARIA C BUSINESS RDS
REG
RADIO PRESET
6 FM1, 6 FM2 and 6 AM (MV/LW) WITH LED INDICATION
ON/OFF VOLUME
DOWN TUNING
UP TUNING
TP
TA

Fig. 7

FM/AM (MW/LW)

Select FM or AM (MW/LW) reception with the corresponding band button. Each time the FM button is pressed, the radio switches between FM1 and FM2. Switching between LW and MW is accomplished using the tuning button. The MW band is from 531 kHz to 1,620 kHz, and the LW band is from 153 kHz to 279 kHz.

MANUAL/SEEK TUNING

To Perform manual tuning, press the "*" button and "m" will be displayed on the screen. Then, using UP and DOWN buttons will allow you to carry out tuning. After the "*" or UP/DOWN button has been pressed, the system will remain in the mode for 8 seconds. Without "m" displayed, either UP or DOWN button will cause the system to operate in the SEEK TURNING mode.

AUTOMATIC LOCAL/DISTANCE SWITCHING

New electronic circuitry automatically selects the local/distance mode for best reception, eliminating the need for manual switching.

SCAN TUNING

Signal scan tuning allows you to tune into each medium-to-strong frequency pausing eight seconds at each. Push the SCAN button once to begin tuning up scale, and press it again during a pause to stop the scanning. The display shows SCAN during scan tuning.

FM RECEPTION

Signal reflections or blockages caused by hills or tall buildings may cause hissing and fluttering noises in FM reception. FM signal strength diminishes beyond 40 km from the transmitter.

PROGRAMMING / REPROGRAMMING PRESET STATIONS

Tune in the desired radio station. Then push a PRESET selection button for 2 seconds. Repeat this procedure for the remaining preset station selectors on the FM (FM1 and FM2) and AM bands.

NOTE: The radio programming controls have fourth functions. Each button can be set to one FM1, one FM2, one MW and one LW station.

BASS, TREBLE, FADER, BALANCE AND LOUDNESS CONTROL

Each time the MODE button is pressed, control of bass, treble, fader, balance or loudness is selected in turn. The selected mode is shown on the display and can be adjusted by the + and - buttons. Approximately five seconds after adjustment, the display returns to its previous state.

When the MODE button is pressed continuously for more than 2 seconds. the level of each mode returns to flat or center. At this time "LINEAR" is displayed on the display.

TELEPHONE MUTING

Should your BMW vehicle be equipped with the cellular telephone with muting feature, the radio volume will be reduced (gradually) when an incoming telephone call is received. Tape cassette /compact disc functions will automatically go into a pause mode. Radio volume is restored after the telephone call has been completed as are tape cassette/compact disc functions.

6. USING THE TAPE DECK

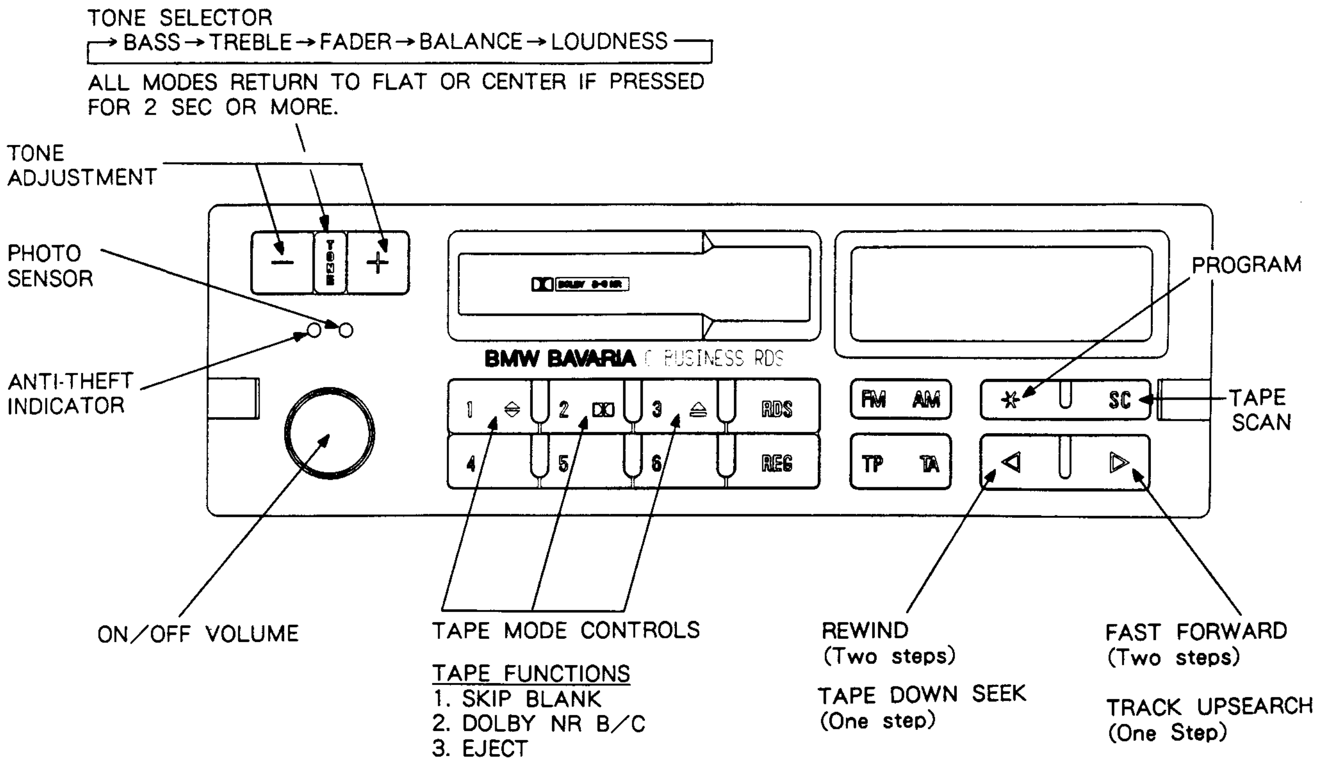

TONE SELECTOR
→ BASS → TREBLE → FADER → BALANCE → LOUDNESS
ALL MODES RETURN TO FLAT OR CENTER IF PRESSED FOR 2 SEC OR MORE.
TONE ADJUSTMENT
PHOTO SENSOR
ANTI-THEFT INDICATOR
BMW BAVARIA C BUSINESS RDS
PROGRAM
TAPE SCAN
ON/OFF VOLUME
TAPE MODE CONTROLS
TAPE FUNCTIONS
1. SKIP BLANK
2. DOLBY NR B/C
3. EJECT
REWIND
(Two steps)
TAPE DOWN SEEK
(One step)
FAST FORWARD
(Two steps)
TRACK UPSEARCH
(One Step)
RDS
REG
FM
AM
TP
TA
SC

Fig. 8

CASSETTE OPERATION

To use the cassette player, turn the radio on. When a cassette is inserted, the unit will switch automatically from radio to tape mode.

FAST FORWARD/REWIND*

If the UP button is pressed twice within 2 seconds, the system will operate in the FAST FORWARD mode. If the DOWN button is pressed twice within two seconds, the system will operate in the REWIND mode. Pressing the UP or DOWN button during the FAST FORWARD or REWIND operation will cause the system to restore the PLAY operation mode.

A standard cassette has two sides and can be played in either direction. When in play, the top side of a cassette will be indicated as "1" on the display. The bottom side will appear as "2".

*Synchro FFR. REW under license of Staar S. A.

TAPE SEEK

Press the UP button and the system will be put into the FMS operation. Press the DOWN button and the system will be put into the RMS operation. Pressing the UP or DOWN button during the FMS or RMS operation will cause the system to restore the PLAY operation mode.

Tape Seek will only function correctly if there are four seconds of silence between the selections on your tape. Excessive noise between selections on home-recorded tapes may interfere with these functions.

The cassette automatically ejects from the unit if tape setting operations cannot be completed within a few seconds. This may be caused by a faulty or damaged cassette. Determine the cause of the problem or use a different cassette.

REVERSING TAPE DIRECTION

To reverse tape direction, push the DIRECTION button (1 ⇕). Additionally the tape will reverse automatically when a side is complete.

AUTOMATIC EQUALIZATION

The playback equalization of normal tapes differs from that of chrome and metal tapes. When a high-bias tape, including metal, is inserted, the unit will automatically change to the correct equalization level, and CR will be indicated on the display.

TAPE EJECT (3 EJ)

Press the EJECT button – 3 EJ – to eject tape cassette and return to the radio mode.

DOLBY® B/C NOISE REDUCTION (2 ᗡD)

Use the Dolby®* B/C Noise Reduction function – button 2 ᗡD – to reduce the level of hiss on Dolby® B/C-encoded cassette. If you do not use the Dolby® B/C noise-reduction function with Dolby® B/C encoded tapes, the high-frequency response will be intensified. If you do use this function with non-Dolby® B/C tapes, high-frequency response will be diminished.

Press the Dolby NR button and the Dolby NR Type B will turn on and the Dolby NR Type C will turn off. Press it once more and the Dolby NR Type C will turn on and the Dolby NR Type B will turn off. Subsequently pressing the button will cause both Dolby NR Types B and C to turn off.

* The word "Dolby" and the double-D symbol are registered trademarks of Dolby Laboratories, Inc.

IGNITION-KEY-OFF PAUSE MODE

If the ignition is turned off while a tape is playing, the unit automatically enters the pause mode. The unit will return to normal play mode when the ignition is turned on. The unit will not accept another cassette when it is in the pause mode.

AUTOMATIC TAPE SLACK CANCELER (ATSC)

The automatic tape slack canceler removes any slack in the tape before play to protect the tape and extend its life.

7. PLAYING THE CD CHANGER

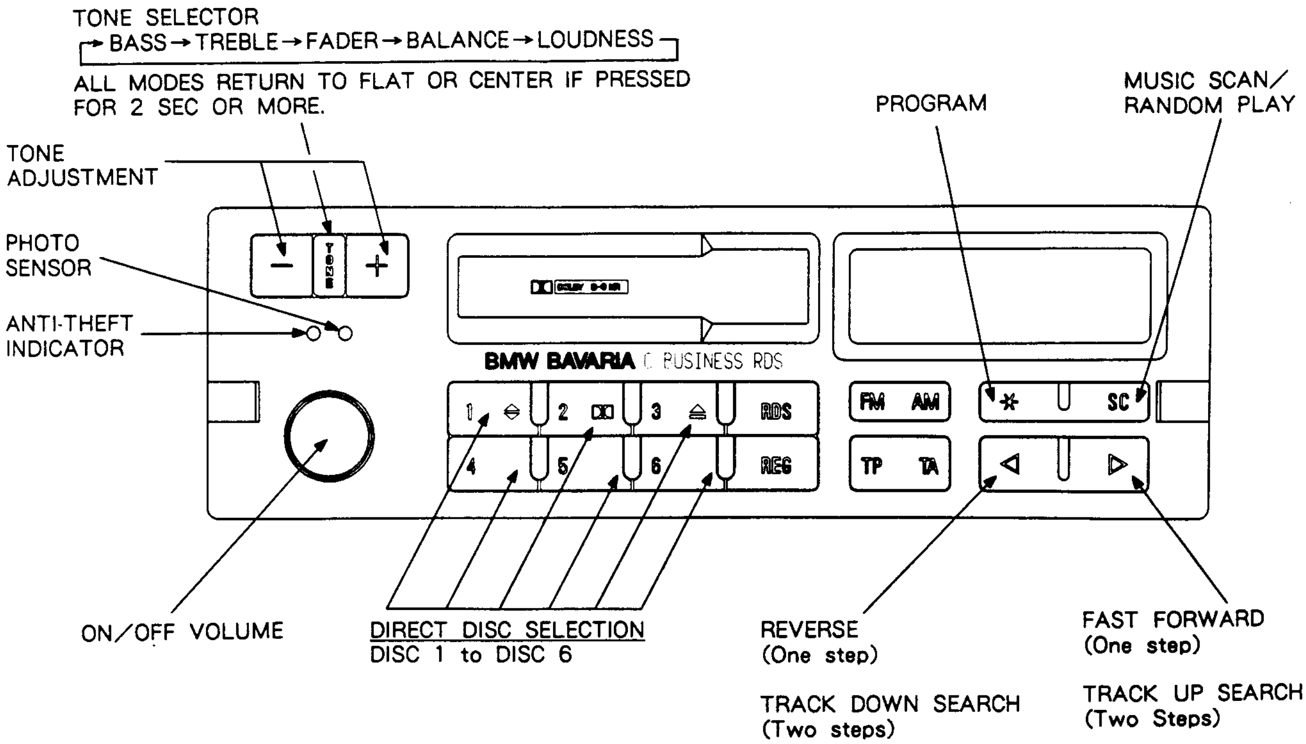

TONE SELECTOR
→ BASS → TREBLE → FADER → BALANCE → LOUDNESS
ALL MODES RETURN TO FLAT OR CENTER IF PRESSED FOR 2 SEC OR MORE.
TONE ADJUSTMENT
PHOTO SENSOR
ANTI-THEFT INDICATOR
PROGRAM
MUSIC SCAN/ RANDOM PLAY
BMW BAVARIA C BUSINESS RDS
1
2
3
RDS
4
5
6
REG
FM
AM
TP
TA
SC
ON/OFF VOLUME
DIRECT DISC SELECTION
DISC 1 to DISC 6
REVERSE
(One step)
TRACK DOWN SEARCH
(Two steps)
FAST FORWARD
(One step)
TRACK UP SEARCH
(Two Steps)

Fig. 9

CD OPERATION

To use the CD player, turn on the radio receiver and then press the "＊". Within 8 seconds thereafter, press the "＊" button once more and the display will switch over to the CD mode.

DIRECT DISC SELECTION

DIRECT DISC SELECT buttons 1 through 6 correspond to the magazine tray numbers.

NOTE: Nothing will happen if you press a button whose indicator is not lit. The display will read "NO DISC" for approximately 8 seconds.

FAST FORWARD/REVERSE

Press the "＊" button and "in" will be indicated in the display for 8 seconds. During this period of 8 seconds, press the ">" button and the system will be put into the FAST FORWARD operation. And pressing the "<" button likewise will put the system into the REVERSE operation.
On the display, ">>" is indicated during the FAST FORWARD operation and "<<R" during the REVERSE operation.

TRACK SEARCH

Pressing the fast forward/reverse button activates the track search mode. To advance to the next track, press the right side of button. To return to the previous track, press the left side of button in the same manner push and hold the button down to move forward or backward through the tracks.

MUSIC SCAN

When the SCAN button is pressed, the word "SCAN" appears on the display and the player begins playing the first part (approximately 10 seconds) of each track on the current disc. Press the button again when you find a track you want to listen to : the player will return to normal playback and continue with the current track.

RANDOM PLAY

Press the "*" button and "in" will be indicated in the display for 8 seconds. During this period of 8 seconds, press the"SC" button and the system will be put into the random play.(RND appears on the display.) This function randomly plays one track after another, choosing from all the tracks on all the discs in the magazine randomly. Press the SC button again to cancel random play.

NOTE: Since tracks are selected at random, it is possible that the same track may be played twice in succession.

MAGAZINE CHECK

When there is no magazine in the CD changer, the word "NO MAGAZINE" appears on the display to advise you to load a magazine.

NOTE: After you load a magazine, there is a short pause before playback begins. The changer is checking each of the trays for discs in the magazine. (The display indicates "DISC CHECK".)

DISC CHECK

A "DISC ERROR" indication is shown on the display and operation of the system becomes impossible when there are no discs in the magazine or when the discs are loaded into the magazine with their labels facing upwards. Whenever this message appears, remove the magazine and check the discs.

Important: "HIGH TEMP" appears on the display and playback automatically stops when the temperature around the CD changer becomes too high. This protects the laser mechanism from serious damage. Listen to the radio or a tape until the temperature returns to normal. When the temperature around the CD changer becomes low, the display shows "LOW TEMP". The CD changer will continue to operate.

8. BLOCK DIAGRAM

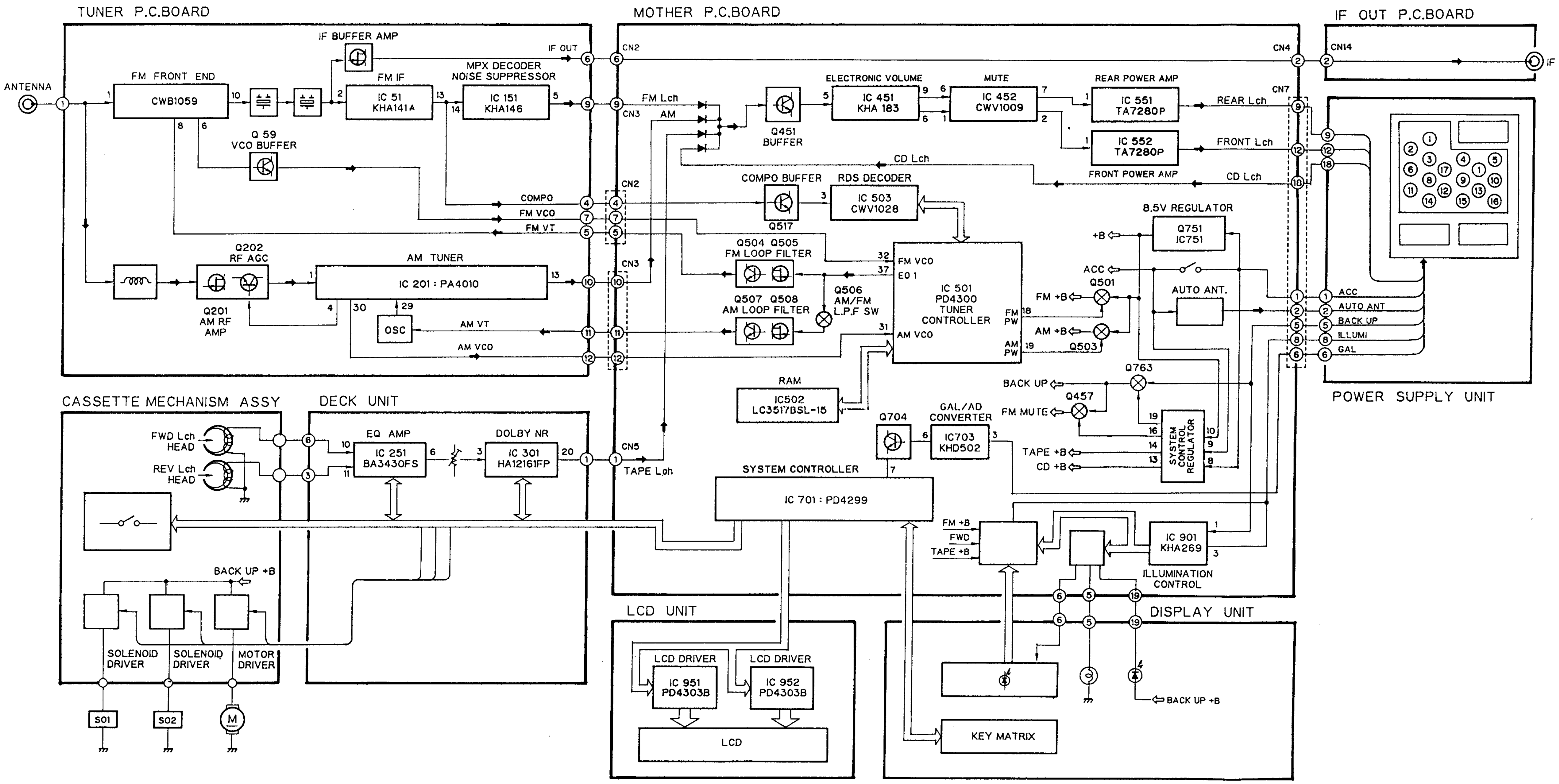

TUNER P.C.BOARD
ANTENNA
FM FRONT END
CWB1059
IF BUFFER AMP
FM IF
IC 51
KHA141A
MPX DECODER
NOISE SUPPRESSOR
IC 151
KHA146
IF OUT
Q 59
VCO BUFFER
COMPO
FM VCO
FM VT
Q202
RF AGC
Q201
AM RF
AMP
AM TUNER
IC 201 : PA4010
OSC
AM VT
AM VCO
MOTHER P.C.BOARD
CN2
CN3
CN4
CN5
CN7
FM Lch
AM
Q451
BUFFER
ELECTRONIC VOLUME
IC 451
KHA 183
MUTE
IC 452
CWV1009
REAR POWER AMP
IC 551
TA7280P
IC 552
TA7280P
FRONT POWER AMP
REAR Lch
FRONT Lch
CD Lch
COMPO BUFFER
Q517
RDS DECODER
IC 503
CWV1028
Q504 Q505
FM LOOP FILTER
Q507 Q508
AM LOOP FILTER
Q506
AM/FM
L.P.F SW
FM VCO
EO 1
IC 501
PD4300
TUNER
CONTROLLER
AM VCO
FM PW
AM PW
8.5V REGULATOR
Q751
IC751
+B
ACC
Q501
FM +B
AM +B
Q503
AUTO ANT.
Q763
BACK UP
Q457
FM MUTE
RAM
IC502
LC3517BSL-15
Q704
GAL/AD
CONVERTER
IC703
KHD502
SYSTEM CONTROL REGULATOR
TAPE +B
CD +B
SYSTEM CONTROLLER
IC 701 : PD4299
TAPE Lch
IF OUT P.C.BOARD
CN14
IF OUT
ACC
AUTO ANT
BACK UP
ILLUMI
GAL
POWER SUPPLY UNIT
CASSETTE MECHANISM ASSY
FWD Lch
HEAD
REV Lch
HEAD
DECK UNIT
EQ AMP
IC 251
BA3430FS
DOLBY NR
IC 301
HA12161FP
BACK UP +B
SOLENOID
DRIVER
SOLENOID
DRIVER
MOTOR
DRIVER
S01
S02
M
LCD UNIT
LCD DRIVER
IC 951
PD4303B
LCD DRIVER
IC 952
PD4303B
LCD
FM +B
FWD
TAPE +B
IC 901
KHA269
ILLUMINATION
CONTROL
DISPLAY UNIT
BACK UP +B
KEY MATRIX

Fig. 10

9. ADJUSTMENT

9.1 TEST MODE

1) Precautions

- The CDX-M92ZBM uses a single power supply (+5V) for the regulator. The signal reference potential, there fore, is connected to pin no. 21 (approx. 2.5V) of IC351 (CXA1081Q) instead of GND. (VC or VREF at test point)

If VC and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.

Do not connect the negative probe of the measuring equipment to VC and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to VC with the channel 2 negative probe connected to GND.

And since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.

If by accident VC comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.
- When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing the another key. Otherwise, there is risk of the actuator being destroyed. (For example, do not press the + key while a disc is being moved from magazine to clamp after regulator is switched ON in steps 3 thru 5 of Tracking Balance Adjustment I. Nor should the EJECT key (in M92ZBM) be pressed during focus closed status.)

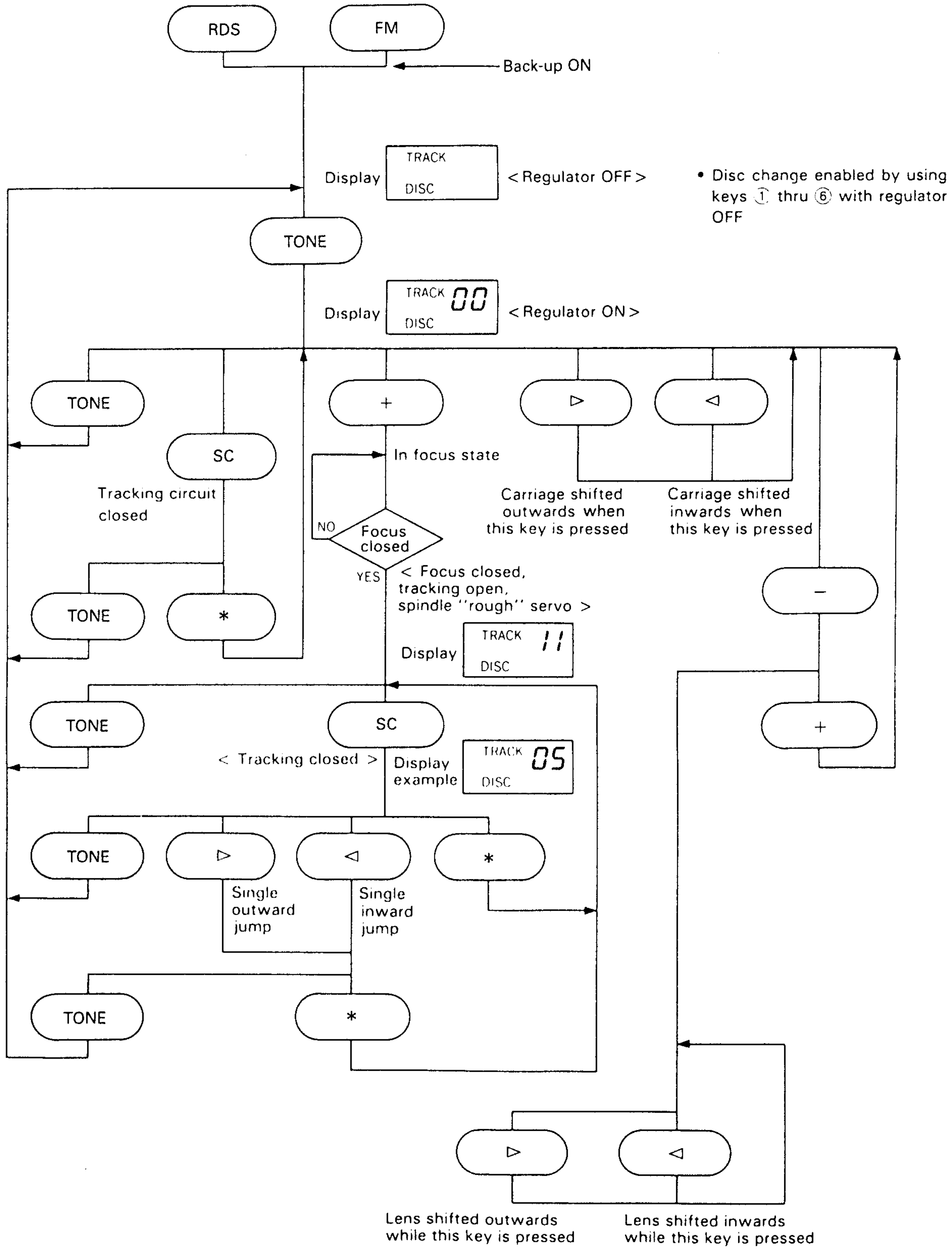
2) Since CDX-M92ZBM is used in combination with a multi-CD control section such as KE-92ZBM, all adjustment key operations are executed at that control section.
The KE-92ZBM, test mode starting procedure and key operations are included for reference purposes. All keys mentioned in the main text are KE-92ZBM keys.

- Text mode starting procedure
  Switch back-up ON while pressing the RDS and FM keys together.
- Test mode cancellation
  Switch the KE-92ZBM and CDX-M92ZBM back-up OFF.)

Key functions during test mode.

Key	Function
TONE	Regulator ON/OFF
▷	FWD kick
◁	REV kick
SC	Tracking close
*	Tracking open
+	Focus close
−	Carriage/tracking switching
1~6	Disc select

● **Flow Chart**


RDS
FM
Back-up ON
Display
TRACK
DISC
< Regulator OFF >
• Disc change enabled by using keys ① thru ⑥ with regulator OFF
TONE
Display
TRACK 00
DISC
< Regulator ON >
TONE
SC
Tracking circuit closed
TONE
*
+
In focus state
NO
Focus closed
YES
< Focus closed, tracking open, spindle "rough" servo >
Display
TRACK 11
DISC
▷
◁
Carriage shifted outwards when this key is pressed
Carriage shifted inwards when this key is pressed
−
+
TONE
SC
< Tracking closed >
Display example
TRACK 05
DISC
TONE
▷
◁
*
Single outward jump
Single inward jump
TONE
*
▷
◁
Lens shifted outwards while this key is pressed
Lens shifted inwards while this key is pressed

9.2 SERVICE MODE

Serviceman's Functions:

The following functions are available:

- Indicating a serial number
- Indicating a software version number
- Checking the LCD
- Selecting a GAL control level
- Selecting an FM seeking level
- Selecting a destination

Within 4 seconds after turning on the POWER switch, press the * key after the system has Started operating normally. After that, press both PRESET Switches 1 and 4 and the system will be put into the SERVICE mode. Now, "SERVICE" is displayed on the LCD. No sound is produced throughout the SERVICE mode. It will not play even if a cassette tape is inserted. In the SERVICE mode, use the UP/DN keys to select each function.

Functions in the SERVICE Mode:

- **Indicating a serial number:**
  The serial number is read-in from the fuse ROM and it is displayed on the LCD.

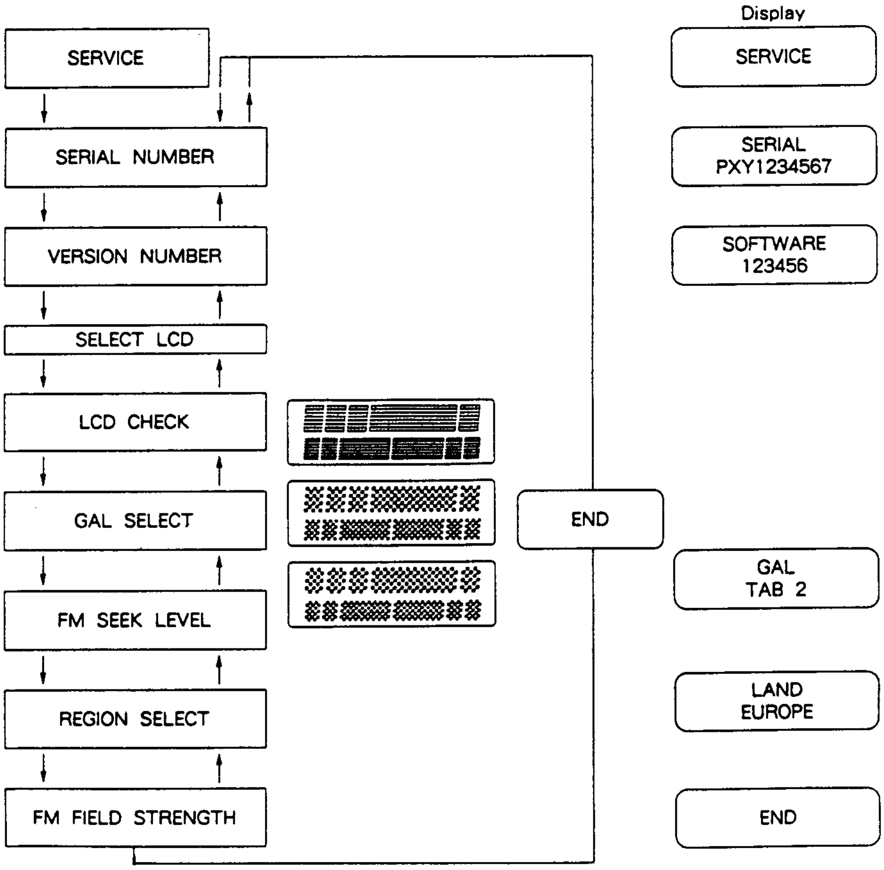
```
SERIAL
X1234567␣␣
```

X : Year

- **Indicating a Software Version Number:**
  The version number of software stored in the program ROM is indicated.

```
SOFTWARE
WWYYXX
```

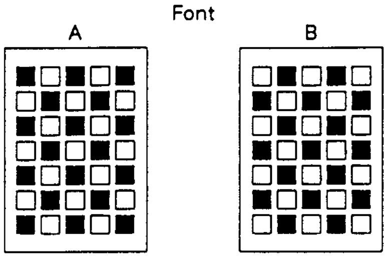
WW : Calendar week (a numeral of 2 digits)
YY : Year (two least significant digits of a dominical year)
XX : A serial number of 2 digits starting with 00


Display
SERVICE
SERIAL NUMBER
VERSION NUMBER
SELECT LCD
LCD CHECK
GAL SELECT
FM SEEK LEVEL
REGION SELECT
FM FIELD STRENGTH
END
SERVICE
SERIAL
PXY1234567
SOFTWARE
123456
GAL
TAB 2
LAND
EUROPE
END

The SERVICE mode will be reset in 8 seconds after selecting the END mode or immediately after tuning off the POWER switch.

- **Checking the LCD:**
Key 1 thru 4 are used to display each character on the entire face of the LCD.

KEY	DISPLAY
1	"■"
2	Font A
3	Font B
4	" " (space)



- **Selecting a GAL Control Level:**
Using Keys 1 thru 3 permits the GAL to control. To select a GAL control level, select a characteristic curve.

KEY	DISPLAY		LEVEL OF CHANGE	CHARACTERISTIC CURVE
	UPPER	LOWER		
1	GAL	TAB 1	+8dB MAX	Curve 1
2	GAL	TAB 2	+8dB MAX	Curve 2
3	GAL	TAB 3	+8dB MAX	Curve 3

- **Selecting the LCD:**
The angle at which the LCD is watched (vertically) is selected.

PRESET BUTTON	DISPLAY		ANGLE OF SIGHT
	UPPER	LOWER	
1	LCD 1		upward
2	LCD 2		downward

- **Selecting a Region:**
The receiving frequency range and the frequency step can be switched.

PRESET BUTTON	DISPLAY		REGION
	UPPER	LOWER	
1	REGION 1	EUROPE	Europe
2	REGION 2	AMERICA	USA

- **Frequency Range**

BAND	EUROPE	USA
FM	87.5~108.0MHz	87.7~107.9MHz
MW	531~1602kHz	530~1710kHz
LW	153~279kHz	OFF

- **Frequency Step**

BAND	EUROPE	USA
FM	50kHz	200kHz
MW	9kHz	10kHz
LW	3kHz	OFF

- The TP button, moreover, remains invalid in the USA mode.

- **Indicating an FM Field Strength**

```
 F M   X X X X
P Y        Z Z
```

X X X X : Frequency
P : Preset number
Y : EM 1/2
Z Z : Field strength indication (6 bit)

9.3 AUDIO/TUNER ADJUSTMENT

● Connection Diagram

Notice:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z:Output impedance of the SSG.

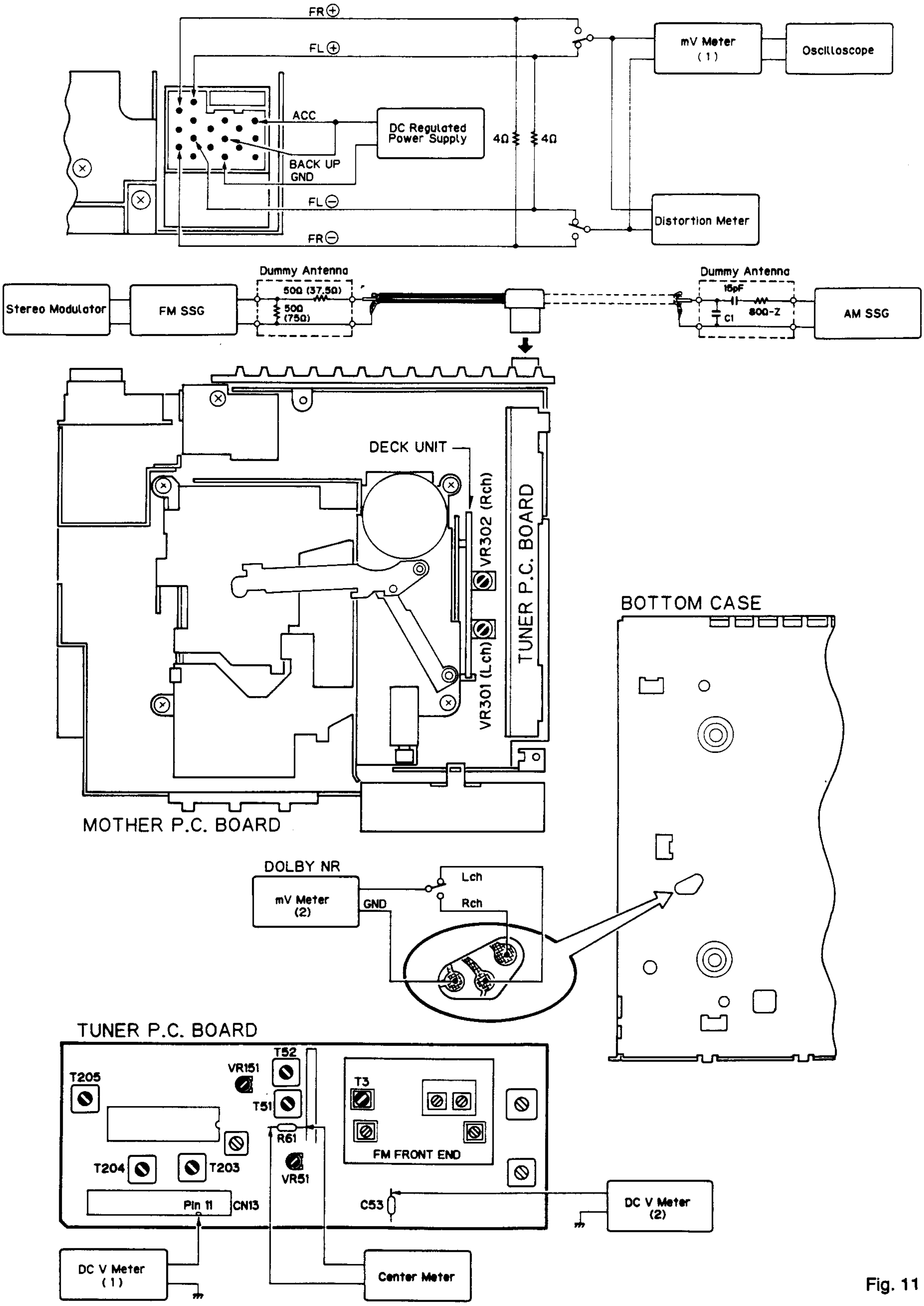

FR⊕
FL⊕
ACC
BACK UP
GND
FL⊖
FR⊖
DC Regulated Power Supply
4Ω
4Ω
mV Meter (1)
Oscilloscope
Distortion Meter
Stereo Modulator
FM SSG
Dummy Antenna
50Ω (37.5Ω)
50Ω (75Ω)
Dummy Antenna
15pF
C1
80Ω-Z
AM SSG
DECK UNIT
VR302 (Rch)
VR301 (Lch)
TUNER P.C. BOARD
MOTHER P.C. BOARD
BOTTOM CASE
DOLBY NR
mV Meter (2)
GND
Lch
Rch
TUNER P.C. BOARD
T205
VR151
T52
T51
T3
R61
T204
T203
VR51
FM FRONT END
Pin 11
CN13
C53
DC V Meter (2)
DC V Meter (1)
Center Meter

Fig. 11

DOLBY NR ADJUSTMENT

No.	Cassette Tape	Adjusting Point	Adjustment Method (Switch Position)
1	NCT-150(400Hz, 200nwb/m)	VR301(Lch) VR302(Rch)	mV Meter(2):-8.2dBs +1.5dB, -0.5dB (DOLBY NR Switch:OFF)

MW/LW ADJUSTMENT

	No.	AM SSG(400Hz, 30%)		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(kHz)	Level(dBμV)			
Tun-ing Volt	1	(LW MODE)		153	—	DC V Meter(1): More than 1.8V
	2	(MW MODE)		1,602	—	DC V Meter(1): Less than 6.7V
IFT	1	999	20	999	T203, T204, T205	mV Meter(1):Maximum

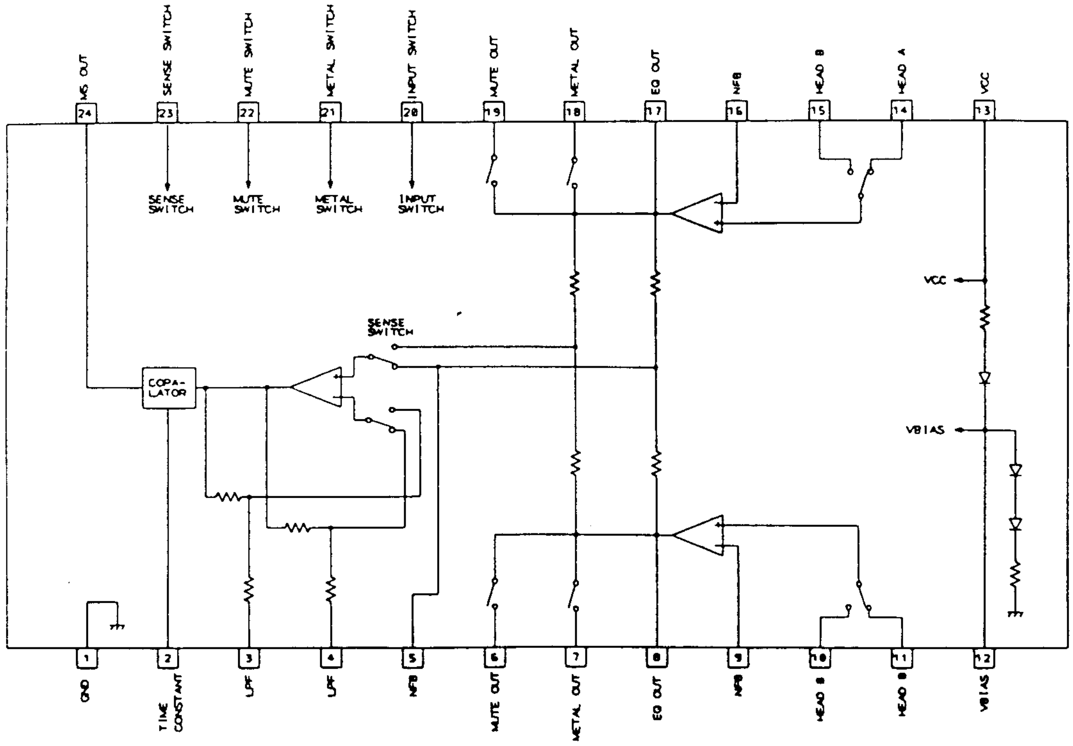
FM ADJUSTMENT

※ Stereo MOD.: 1kHz, L+R=90%, Pilot=10%

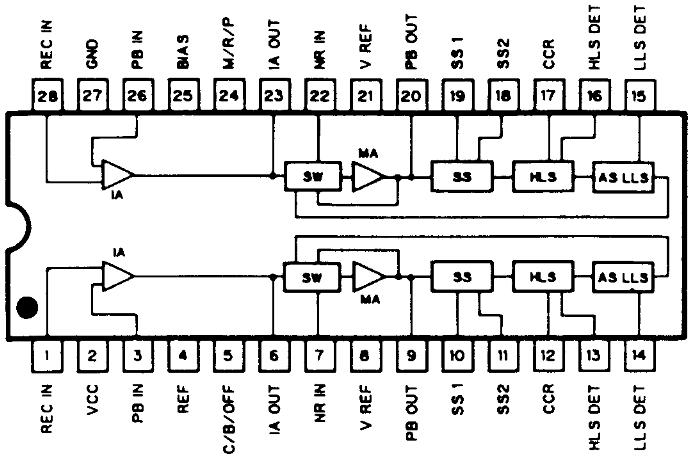
	No.	FM SSG(400Hz, 100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBf)			
Tun-ing Volt	1			87.5	—	DC V Meter(2): More than 0.8V
	2			108.0	—	DC V Meter(2): Less than 7.7V
IFT	1	98.1 Unmodulated	65	98.1	T51	Center Meter:0
	2	98.1	65	98.1	T52	Distortion Meter:Minimum
	3	Repeat No.1-2 alternately so that the center meter indicates the 0 output and distortion meter indicates minimum output.				
	4	98.1	15	98.1	T3 (FM Front End)	Oscilloscope:Optimum Symmetry
ARC	1	98.1※	65	98.1	VR151	mV Meter(1):Separation Maximum
	2	98.1※	42	98.1	VR51	mV Meter(1):Separation 6dB

● ICs

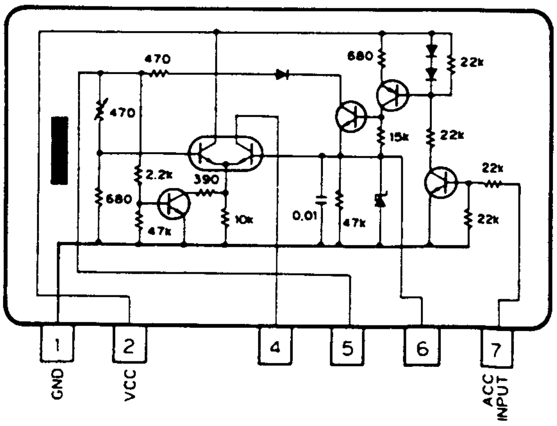
BA3430FS


MS OUT
SENSE SWITCH
MUTE SWITCH
METAL SWITCH
INPUT SWITCH
MUTE OUT
METAL OUT
EQ OUT
NFB
HEAD B
HEAD A
VCC
24
23
22
21
20
19
18
17
16
15
14
13
SENSE SWITCH
MUTE SWITCH
METAL SWITCH
INPUT SWITCH
VCC
SENSE SWITCH
COPA-LATOR
VBIAS
1
2
3
4
5
6
7
8
9
10
11
12
GND
TIME CONSTANT
LPF
LPF
NFB
MUTE OUT
METAL OUT
EQ OUT
NFB
HEAD B
HEAD B
VBIAS

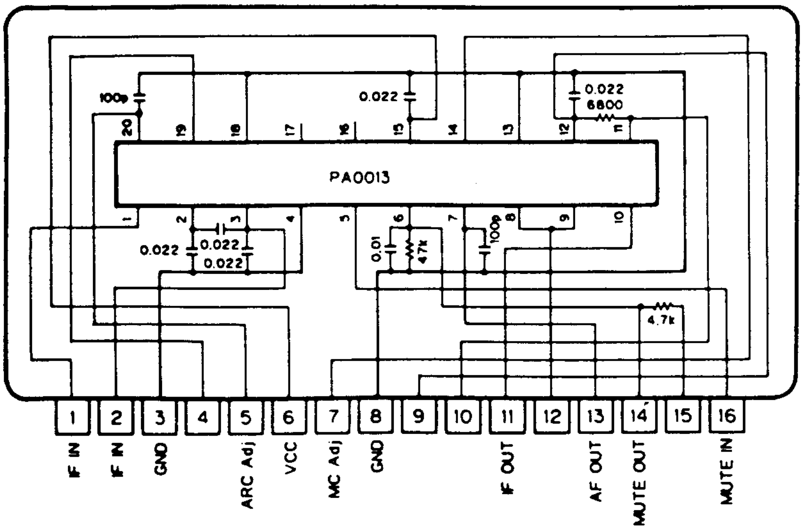
HA12161FP


REC IN
GND
PB IN
BIAS
M/R/P
IA OUT
NR IN
V REF
PB OUT
SS 1
SS2
CCR
HLS DET
LLS DET
28
27
26
25
24
23
22
21
20
19
18
17
16
15
IA
SW
MA
SS
HLS
AS LLS
IA
SW
MA
SS
HLS
AS LLS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
REC IN
VCC
PB IN
REF
C/B/OFF
IA OUT
NR IN
V REF
PB OUT
SS 1
SS2
CCR
HLS DET
LLS DET

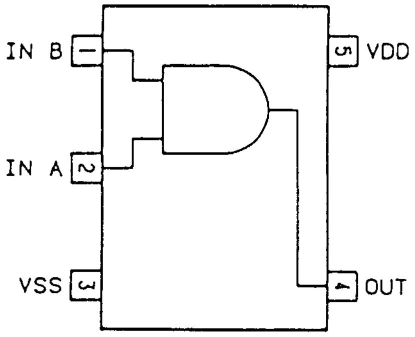
KHA241


470
680
22k
470
15k
22k
2.2k
390
22k
680
0.01
47k
10k
47k
22k
1
2
4
5
6
7
GND
VCC
ACC INPUT

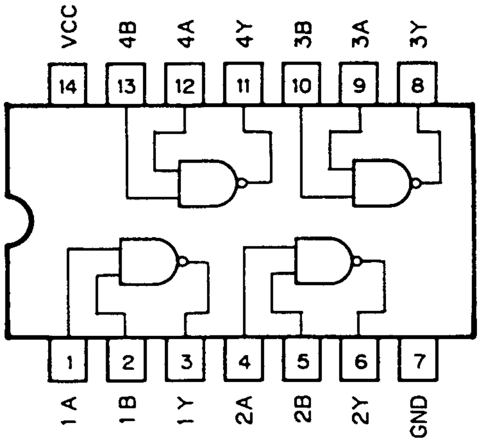
KHA141A


PA0013
100p
0.022
0.022
6800
0.022
0.022
0.022
0.01
47k
100p
4.7k
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
IF IN
IF IN
GND
ARC Adj
VCC
MC Adj
GND
IF OUT
AF OUT
MUTE OUT
MUTE IN

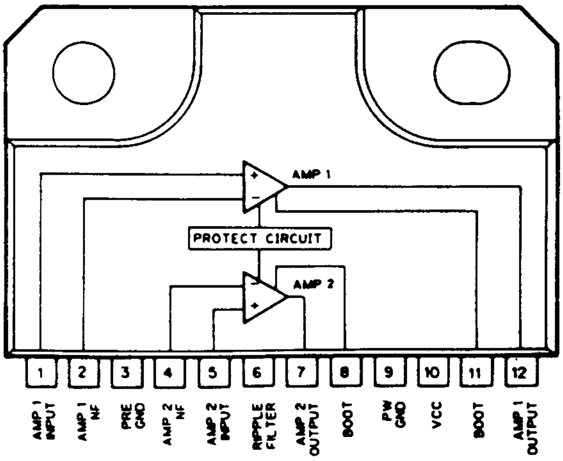
TC4S81F


IN B
1
IN A
2
VSS
3
5
VDD
4
OUT

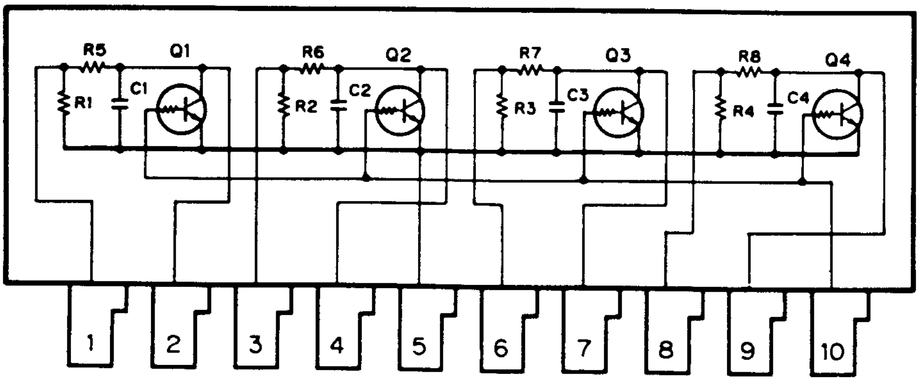
TC74HC00AF


VCC
4B
4A
4Y
3B
3A
3Y
14
13
12
11
10
9
8
1
2
3
4
5
6
7
1A
1B
1Y
2A
2B
2Y
GND

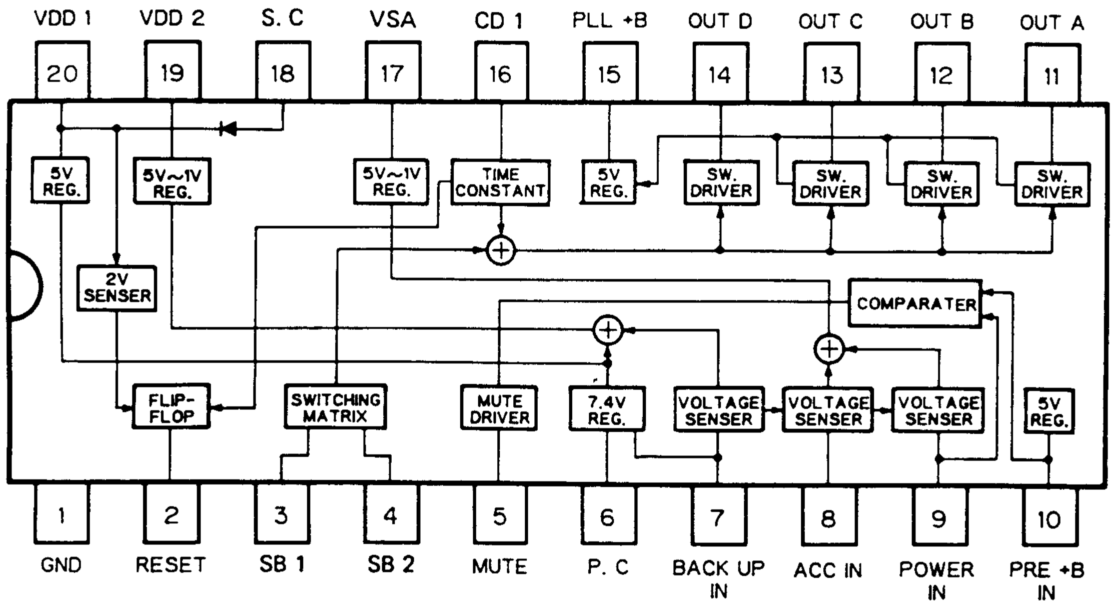
TA7280P


AMP 1
PROTECT CIRCUIT
AMP 2
1
2
3
4
5
6
7
8
9
10
11
12
AMP 1 INPUT
AMP 1 NF
PRE GND
AMP 2 NF
AMP 2 INPUT
RIPPLE FILTER
AMP 2 OUTPUT
BOOT
PW GND
VCC
BOOT
AMP 1 OUTPUT

CWV1009


R5
Q1
R1
C1
R6
Q2
R2
C2
R7
Q3
R3
C3
R8
Q4
R4
C4
1
2
3
4
5
6
7
8
9
10

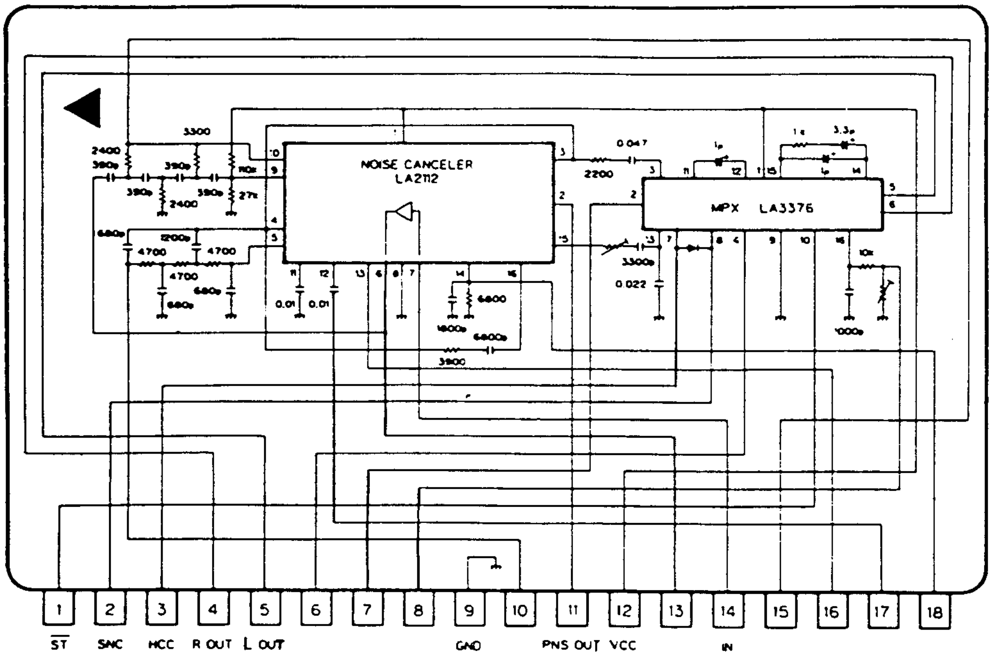
PA1004A


VDD 1
VDD 2
S. C
VSA
CD 1
PLL +B
OUT D
OUT C
OUT B
OUT A
20
19
18
17
16
15
14
13
12
11
5V REG.
5V~1V REG.
5V~1V REG.
TIME CONSTANT
5V REG.
SW. DRIVER
SW. DRIVER
SW. DRIVER
SW. DRIVER
2V SENSER
COMPARATER
FLIP-FLOP
SWITCHING MATRIX
MUTE DRIVER
7.4V REG.
VOLTAGE SENSER
VOLTAGE SENSER
VOLTAGE SENSER
5V REG.
1
2
3
4
5
6
7
8
9
10
GND
RESET
SB 1
SB 2
MUTE
P. C
BACK UP IN
ACC IN
POWER IN
PRE +B IN

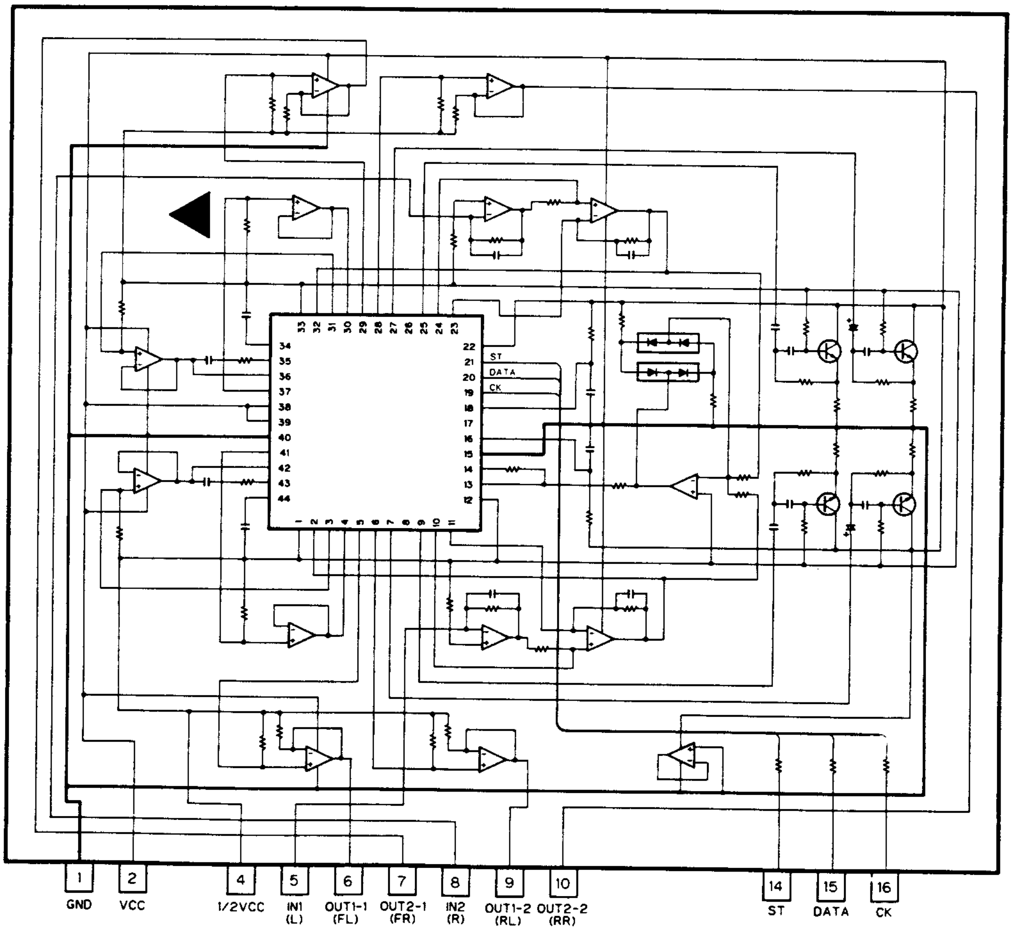
● Pin Function (PA1004A)

Pin No.	Pin Name	Function and Operation
1	GND	GND
2	RESET	Reset puls output.
3	SB1	Switch matrix input.
4	SB2	
5	MUTE	Mute signal output.
6	P.C	Power control.
7	BACK UP IN	Back UP + B input.
8	ACC IN	ACC + B input.
9	POWER IN	Power + B input.
10	PRE + B IN	PRE + B input.
11	OUT A	FM + B output.
12	OUT B	MW + B output.
13	OUT C	LW + B output.
14	OUT D	TAPE + B output.
15	PLL + B	PLL + B output.
16	CD1	Timing capacitor terminal.
17	VSA	Power + B/ACC + B detector output. 0 – 1 – 5V three state output.
18	S.C	VDD maintain capacitor terminal.
19	VDD2	5V output.
20	VDD1	

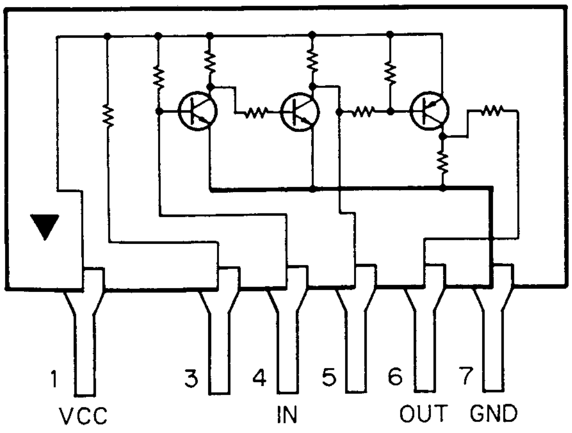
KHA146


NOISE CANCELER
LA2112
MPX LA3376
3300
2400
390p
110k
27k
2400
680p
1200p
4700
4700
4700
680p
680p
0.01
0.01
6800
1800p
6800p
3900
0.047
2200
1μ
1k
3.3μ
3300p
0.022
10k
1000p
1
ST
2
SNC
3
HCC
4
R OUT
5
L OUT
6
7
8
9
GND
10
11
PNS OUT
12
VCC
13
14
IN
15
16
17
18

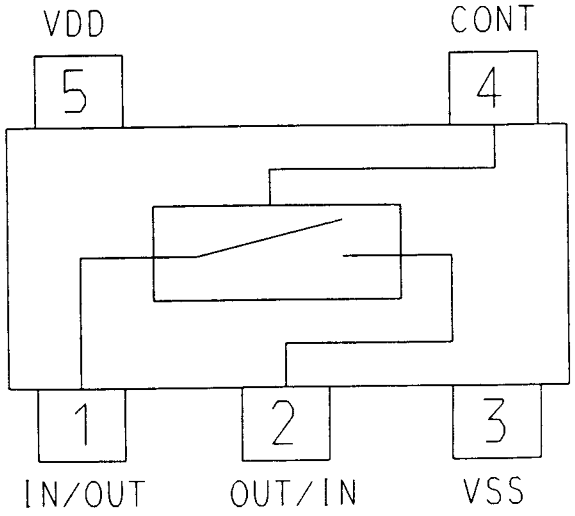
KHA183


ST
DATA
CK
1
GND
2
VCC
4
1/2VCC
5
IN1
(L)
6
OUT1-1
(FL)
7
OUT2-1
(FR)
8
IN2
(R)
9
OUT1-2
(RL)
10
OUT2-2
(RR)
14
ST
15
DATA
16
CK

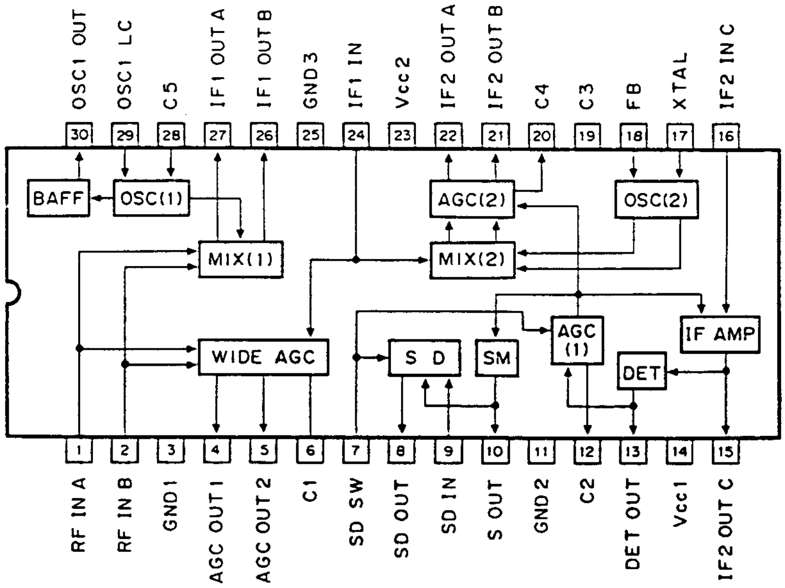
KHD502


1
3
4
5
6
7
VCC
IN
OUT
GND

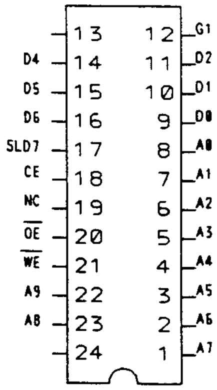
TC4S66F


VDD
CONT
5
4
1
2
3
IN/OUT
OUT/IN
VSS

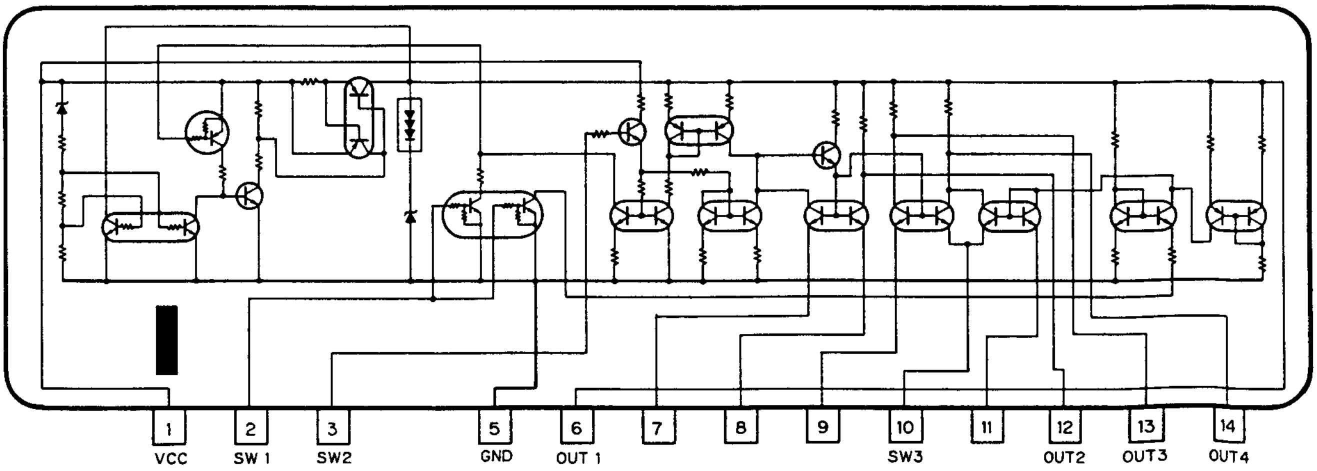
PA4010


OSC1 OUT
OSC1 LC
C5
IF1 OUT A
IF1 OUT B
GND3
IF1 IN
Vcc2
IF2 OUT A
IF2 OUT B
C4
C3
FB
XTAL
IF2 IN C
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
BAFF
OSC(1)
MIX(1)
AGC(2)
MIX(2)
OSC(2)
WIDE AGC
S D
SM
AGC (1)
IF AMP
DET
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
RF IN A
RF IN B
GND1
AGC OUT1
AGC OUT2
C1
SD SW
SD OUT
SD IN
S OUT
GND2
C2
DET OUT
Vcc1
IF2 OUT C

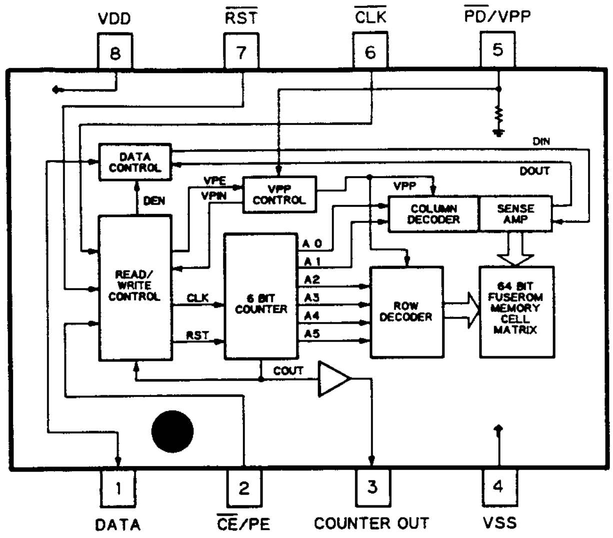
LC3517BSL-15


13
12
G1
D4
14
11
D2
D5
15
10
D1
D6
16
9
D0
SLD7
17
8
A0
CE
18
7
A1
NC
19
6
A2
OE
20
5
A3
WE
21
4
A4
A9
22
3
A5
A8
23
2
A6
24
1
A7

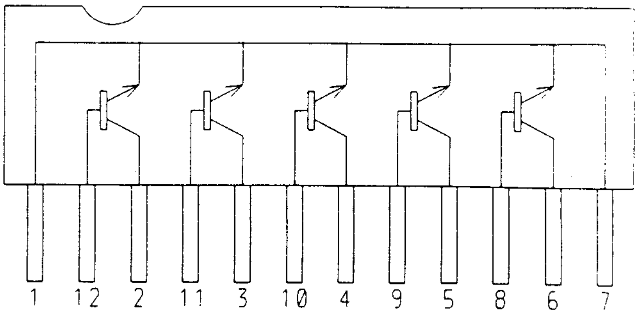
KHA269


1
VCC
2
SW 1
3
SW2
5
GND
6
OUT 1
7
8
9
10
SW3
11
12
OUT2
13
OUT3
14
OUT4

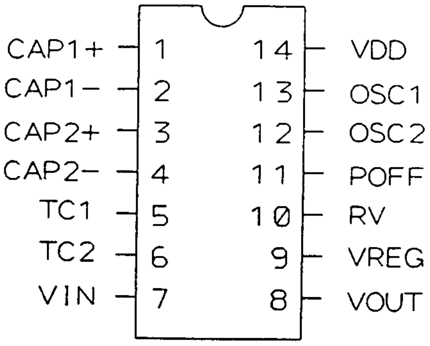
P-2100R


VDD
8
RST
7
CLK
6
PD/VPP
5
DIN
DATA CONTROL
DOUT
VPE
VPIN
VPP CONTROL
VPP
COLUMN DECODER
SENSE AMP
DEN
READ/ WRITE CONTROL
6 BIT COUNTER
A 0
A 1
A2
A3
A4
A5
ROW DECODER
64 BIT FUSEROM MEMORY CELL MATRIX
CLK
RST
COUT
1
DATA
2
CE/PE
3
COUNTER OUT
4
VSS

TA78


1
12
2
11
3
10
4
9
5
8
6
7

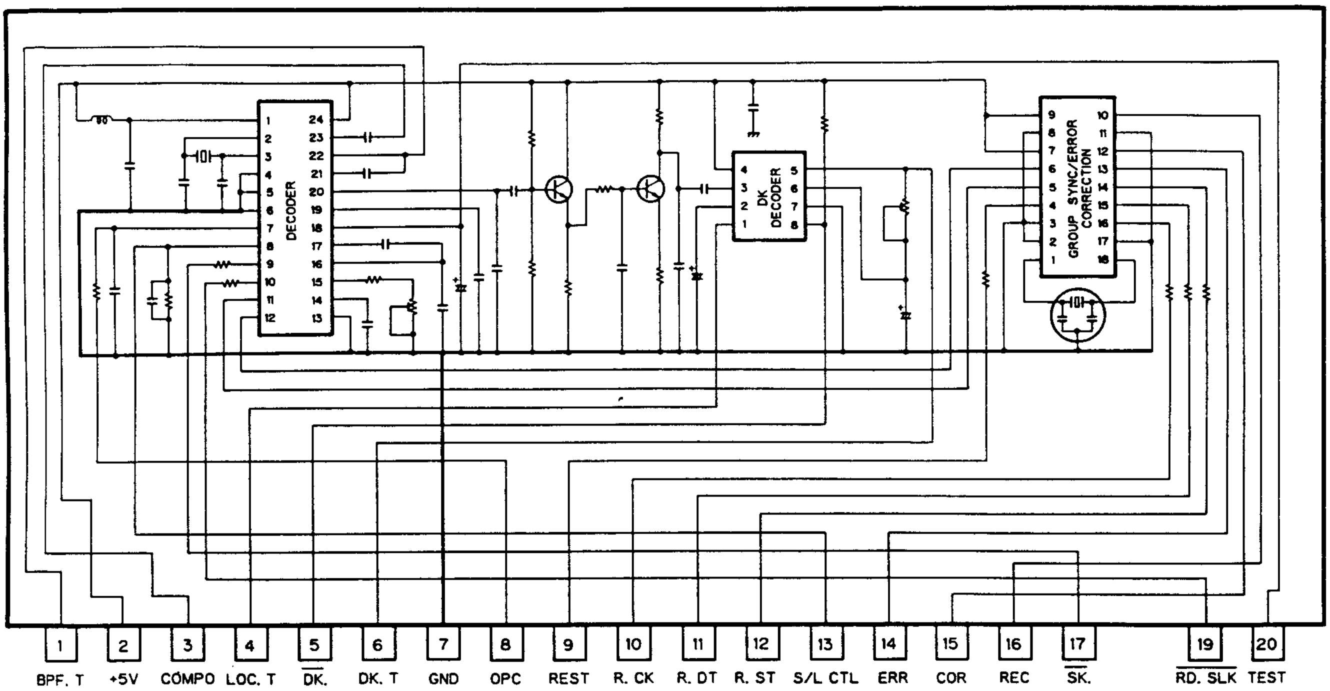
SC17661C


CAP1+ 1
CAP1− 2
CAP2+ 3
CAP2− 4
TC1 5
TC2 6
VIN 7
14 VDD
13 OSC1
12 OSC2
11 POFF
10 RV
9 VREG
8 VOUT

● Pin Functions (SC17661C)

Pin No.	Pin Name	Function and Operation
1	CAP1 +	Connecting terminal on the positive side of a voltage-doubling pump-up capacitor
2	CAP1 −	Connecting terminal on the negative side of a voltage-doubling pump-up capacitor, a clock on the next stage as connected in series
3	CAP2 +	Connecting terminal on the positive side of voltage-tripling pump-up capacitor
4	CAP2 −	Connecting terminal on the negative side of a voltage-tripling pump-up capacitor, output terminal for voltage doubling (short-circuited to VOUT)
5	TC1	Temperature gradient selector terminals
6	TC2	
7	VIH	Power supply terminal (negative side, system-grounded)
8	VOUT	Voltage-tripling output terminal
9	VREG	Stabilized voltage output terminal
10	RV	Stabilized voltage regulator terminal, to regulate the VREG output voltage by connecting the RV terminal with an externally mounted control (3-terminal resistor) connected between VDD and VREG terminals
11	POFF	VREG output ON/OFF control terminal, allowing the SC17661C power-off (VREG output power off) to be controlled by inputting a control signal into this terminal from the system
12	OSC2	Oscillating resistor connecting terminal, to be opened while an external clock is in operation
13	OSC1	Oscillating resistor connecting terminal, serving as a clock input terminal while an external clock is in operation
14	VDD	Power terminal (positive side, system VCC)

CWV1028

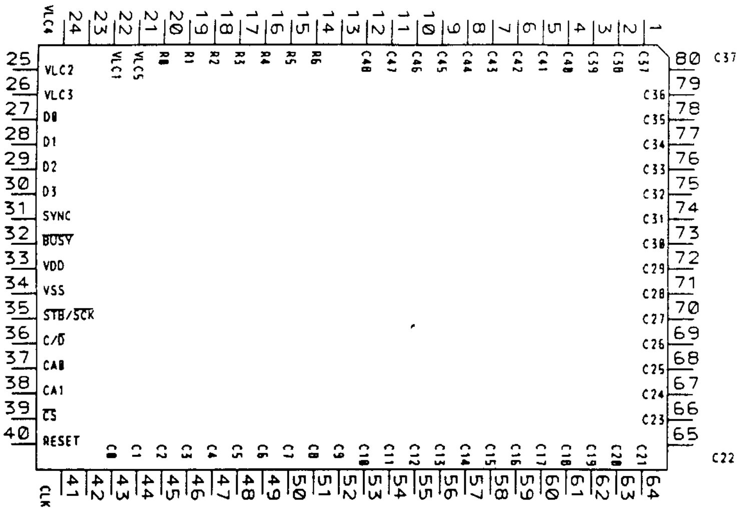

DECODER
RR DK DECODER
GROUP SYNC/ERROR CORRECTION
1 BPF. T
2 +5V
3 COMPO
4 LOC. T
5 DK.
6 DK. T
7 GND
8 OPC
9 REST
10 R. CK
11 R. DT
12 R. ST
13 S/L CTL
14 ERR
15 COR
16 REC
17 SK.
19 RD. SLK
20 TEST

● Pin Functions (CWW1028)

Pin No.	Pin Name	I/O	Function and Operation
1	BPF. T	Output	Band – pass filter output
2	+ 5V	Input	+ 5V input
3	COMPO	Input	Band – pass filter input
4	LOC. T		Low – pass filter capacitor connection
5	DK	Output	DK signal detector output L : As detected
6	DK. T	Input	DK free run confirmation input
7	GND		GND
8	OPC	Input	Operation stop control input H : To operate, L : To stop
9	RESET	Input	System reset input, with L level in 4 or more cycles
10	R. CK	Output	Series data output clock signal
11	R. DT	Output	Series data output data signal
12	R. ST	Output	Series data output block data starting signal
13	S/L CTL	Input	Synchronization detector mode control input H : Short mode, L : Long mode
14	ERR	Output	Error detector output L : An uncorrectable error, which has taken place in series data output H : Correct series data output
15	COR	Output	Error correction detector output L : The output data of the series data output has been corrected or is uncorrectable H : The output data of the series data output is not corrected
16	REC	Output	RDS data receiving output L : Series data being outputted after detecting the synchronization H : Status other than the above
17	SK	Output	SK detection output L : As detected
18	–		
19	RD. SLK	Output	RDS cyclic detection output L : As detected
20	TEST		

* PD4303B

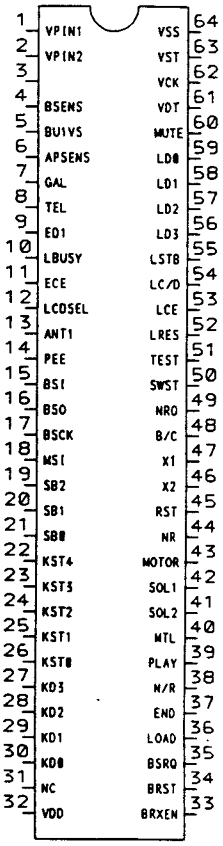
*IC's marked by * are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.


VLC4
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
VLC1 VLC5 R0 R1 R2 R3 R4 R5 R6 C48 C47 C46 C45 C44 C43 C42 C41 C40 C39 C38
25 VLC2
26 VLC3
27 D0
28 D1
29 D2
30 D3
31 SYNC
32 BUSY
33 VDD
34 VSS
35 STB/SCK
36 C/D
37 CA0
38 CA1
39 CS
40 RESET
80 C37
79 C36
78 C35
77 C34
76 C33
75 C32
74 C31
73 C30
72 C29
71 C28
70 C27
69 C26
68 C25
67 C24
66 C23
65 C22
C0 C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21
CLK
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64

● Pin Functions (PD4303B)

Pin No.	Pin Name	I/O	Function and Operation
1 | 12	C38 C49	output	Column
13 | 20	R15/R7 R8/R0	output	Row Not used
21 22	VLC5 VCL1	input	LCD drive voltage supply
23	NC		Non connect
24 25 26	VLC4 VLC2 VLC3	input	LCD drive voltage supply
26 | 30	D0 | D3	input/ output	Data bus
31	SYNC	input/ output	Synchronous
32	BUSY	output	Busy
33	VDD		
34	VSS		
35	STB/SCK	input	Strobe/Serial clock
36	C/D	input	Command/Data
37 38	CA0 CA1	input	Chip address
39	CS	input	Chip select
40	RESET	input	Reset
41	CLK	input	Clock
42	NC		Non connect
43 | 84	C0 | C37	output	Column

* PD4299


1 VPIN1
2 VPIN2
3
4 BSENS
5 BU1VS
6 APSENS
7 GAL
8 TEL
9 ED1
10 LBUSY
11 ECE
12 LCDSEL
13 ANT1
14 PEE
15 BSI
16 BSO
17 BSCK
18 MSI
19 SB2
20 SB1
21 SB0
22 KST4
23 KST3
24 KST2
25 KST1
26 KST0
27 KD3
28 KD2
29 KD1
30 KD0
31 NC
32 VDD
64 VSS
63 VST
62 VCK
61 VDT
60 MUTE
59 LD0
58 LD1
57 LD2
56 LD3
55 LSTB
54 LC/D
53 LCE
52 LRES
51 TEST
50 SWST
49 NRO
48 B/C
47 X1
46 X2
45 RST
44 NR
43 MOTOR
42 SOL1
41 SOL2
40 MTL
39 PLAY
38 N/R
37 END
36 LOAD
35 BSRQ
34 BRST
33 BRXEN

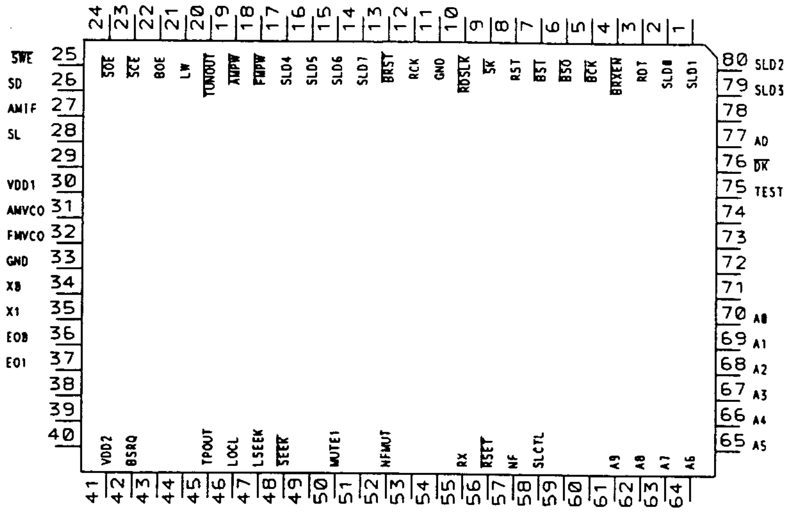
● Pin Functions (PD4299)

Pin	Pin name	I/O	Output Format	Function
1	VPIN1	input		Volume plue 1 (UP direction)
2	VPIN2	input		Volume plue 2 (DOWN direction)
3	NC			Non connect
4	BSENS	input		BACK UP sense 7V detector
5	BU1VS	input		BACK UP sense 1V detector
6	APSENS	input		ACC, power switch sense 0V:ACC ON, 1V:Power OFF, 5V:Power ON
7	GAL	input		Analog input of car speed
8	TEL	input		TEL mute input H:TEL mute request
9	ED1	input		Fuse ROM data input
10	LBUSY	input		LCD driver BUSY input L:LCD BUSY
11	ECE	output	C	Fuse ROM chip enable
12	LCDSEL	output	C	LCD control voltage selector
13	ANT1	output	C	Output for Anti-theft LED
14	PEE	output	C	Beep tone output 4.09kHz
15	BSI	input		Bus data input
16	BSO	output	C	Bus data output
17	BSCK	input/ output		Bus serial clock input/output
18	MSIN	input		MS signal input
19	SB2	output	N	Control output for power supply IC(IC752:PA1004A)
20	SB1			
21	SB0			
22	KST4	output	N	Key strobe output
|	|			
26	KST0			
27	KD3	input		Key return input
|	|			
30	KD0			
31	NC			Non connect
32	VDD			Power supply
33	BRXEN	input/ output	C	Bus reception enable
34	BRST	output	C	Bus reset
35	BSRQ	input		Bus service request(for tuner)
36	LOAD	input		Deck LOAD/EJECT sensor input
37	END	input		Deck END sensor input
38	N/R	input		Deck FWD/REV sensor input
39	PLAY	input		Deck head position(PLAY) sensor input
40	METAL	input		Deck METAL sensor input
41	SOL2	output	C	Output for deck solenoid 1(head position)
42	SOL1	output	C	Output for deck solenoid 2(DIR selector and EJECT)
43	MOTOR	output	C	Deck main motor control output
44	NR	output	C	Dolby NR ON/OFF output
45	RST	input		Reset input
46	X2			Crystal oscillating element connection pin
47	X1			
48	BC	output	C	Dolby NR B/C selector output
49	NRO	output	C	Head FWD/REV output
50	SWST	output	C	Deck mechanism switch strobe ON/OFF output
51	TEST	input		Test pin
52	LRES	output	C	LCD driver reset
53	LCE	output	C	LCD driver chip enable output
54	LC/D	output	C	LCD driver command selector output
55	LSTB	output	C	LCD driver strobe output

Pin	Pin name	I/O	Output Format	Function
56 | 59	LD3 | LD0	output	C	LCD data output
60	MUTE	output	C	Mute output
61	VDT	output	C	Common data for electronic volume IC and fuse ROM
62	VDT	output	C	Common clock for electronic volume IC and fuse ROM
63	VST	output	C	Strobe signal for electronic volume
64	XLT	output	C	Serial data latch output.

Output Format	Meaning
C	C-MOS
N	N channel open drain

* PD4300



24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
SOE
SCE
BOE
LW
TUNOUT
AMPW
FMPW
SLD4
SLD5
SLD6
SLD7
BRST
RCK
GND
RDSLK
SK
RST
BST
BSO
BCK
BRXEN
ROT
SLD0
SLD1
25 SWE
26 SD
27 AMIF
28 SL
29
30 VDD1
31 AMVCO
32 FMVCO
33 GND
34 X0
35 X1
36 EO0
37 EO1
38
39
40
80 SLD2
79 SLD3
78
77 AD
76 DK
75 TEST
74
73
72
71
70 A0
69 A1
68 A2
67 A3
66 A4
65 A5
VDD2
BSRQ
TPOUT
LOCL
LSEEK
SEEK
MUTE1
NFMUT
RX
RSET
NF
SLCTL
A9
A8
A7
A6
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64

● Pin Functions (PD4300)

Pin	Pin name	I/O	Output Format	Function
1 2	SLD1 SLD0	input/output	C	SRAM data input/output
3	RDT	input		Error correction data input
4	$\overline{\text{BRXEN}}$	input/output	C	Bus busy input/output
5	$\overline{\text{BCK}}$	input/output		Serial clock input/output
6	$\overline{\text{BSO}}$	output	C	Serial data output
7	$\overline{\text{BSI}}$	input		Serial data input
8	RST	input		Data start input
9	$\overline{\text{SK}}$	input		SK signal input
10	$\overline{\text{RDSLK}}$	input		RDS signal lock input
11	GND			GND
12	RCK	input		Data clock input
13	$\overline{\text{BRST}}$	input		Bus reset input
14 | 17	SLD7 | SLD4	input/output	C	SRAM data input/output
18	$\overline{\text{FMPW}}$	output	N	FM power supply output
19	$\overline{\text{AMPW}}$	output	N	AM power supply output
20	$\overline{\text{TUNEOUT}}$	output	N	FM tuner sound selector output
21	LW	output	C	LW output
22	BOE	output	C	Bus buffer control output
23	$\overline{\text{SCE}}$	output	C	SRAM chip enable output
24	$\overline{\text{SOE}}$	output	C	SRAM output enable
25	$\overline{\text{SWE}}$	output	C	SRAM read/write output
26	SD	input		SD signal input
27	AMIF	input		AM IF input
28	SL	input		Signal level input
29				Not used
30	VDD			VDD
31	AMVCO	input		AM signal input
32	FMVCO	input		FM signal input
33	GND			GND
34	X0	output	C	Crystal oscillating element connection pin
35	X1	input		
36	EO0	output	C	Not used
37	EO1	output	C	PLL error output
38 39 40				Not used
41	VDD2			VDD
42	BSRQ	output	C	Bus service request output
43 44				Not used
45	TPOUT	output	C	TP/TA illumination output
46	LOCL	output	C	Local L set up output
47	LSEEK	output	C	Outputs high signal during local SEEK operation
48	$\overline{\text{SEEK}}$	output	C	Outputs low signal during SEEK operation
49				Not used
50	MUTE1	output	C	Tuner mute output
51				Not used
52	NFMUT	output	C	Outputs mute signal during NF operation
53 54				Not used

Pin	Pin name	I/O	Output Format	Function
55	RX	output	C	SL time constant selector output
56	$\overline{RSET}$	output	C	RDS data reset output
57	NF	output	C	Output for PNS attenuator circuit
58	SLCTL	output	C	RDS decoder time constant selector output
59 | 70	A11 | A0	output	C	SRAM address output
71 | 74	OP3 | OP0	output	C	Not used
75	TEST	input		Test mode input
76	$\overline{DK}$	input		DK signal input
77 78	AD			Not used
79 80	SLD3 SLD2	input/ output	 C	SRAM data input/output

Output Format	Meaning
C	C-MOS
N	N channel open drain

● LCD (CAW1111)

COMMON

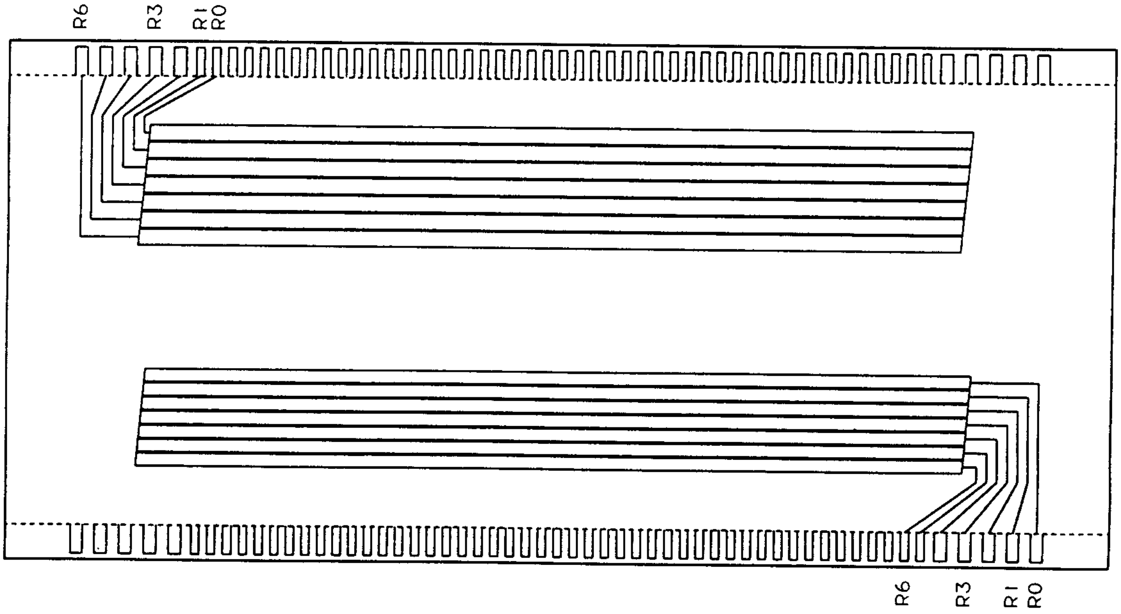


Fig. 12-1

SEGMENT

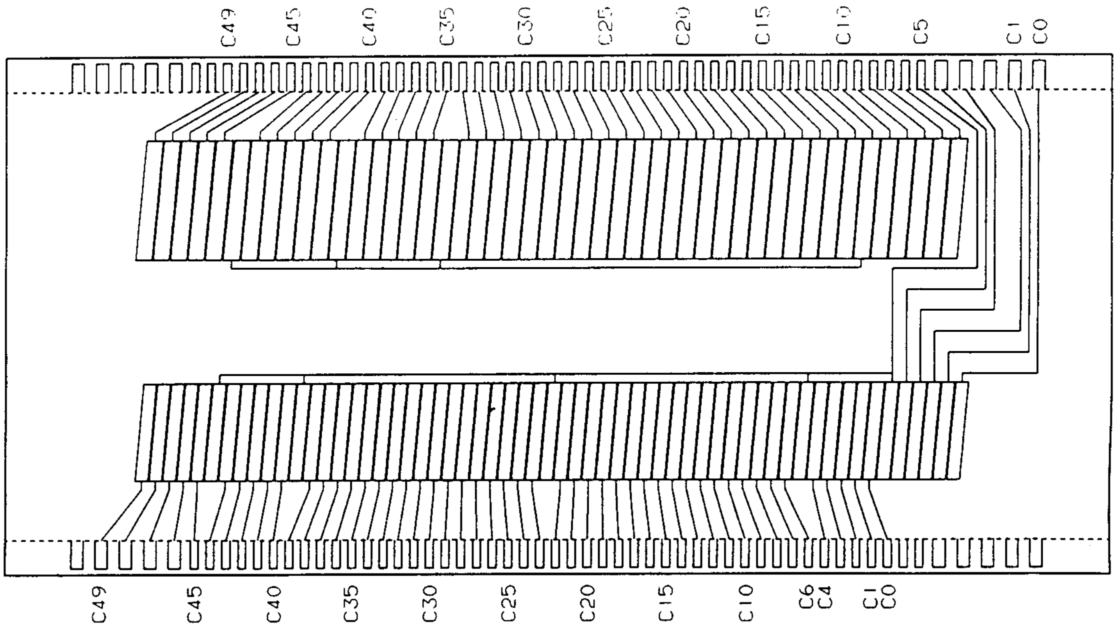
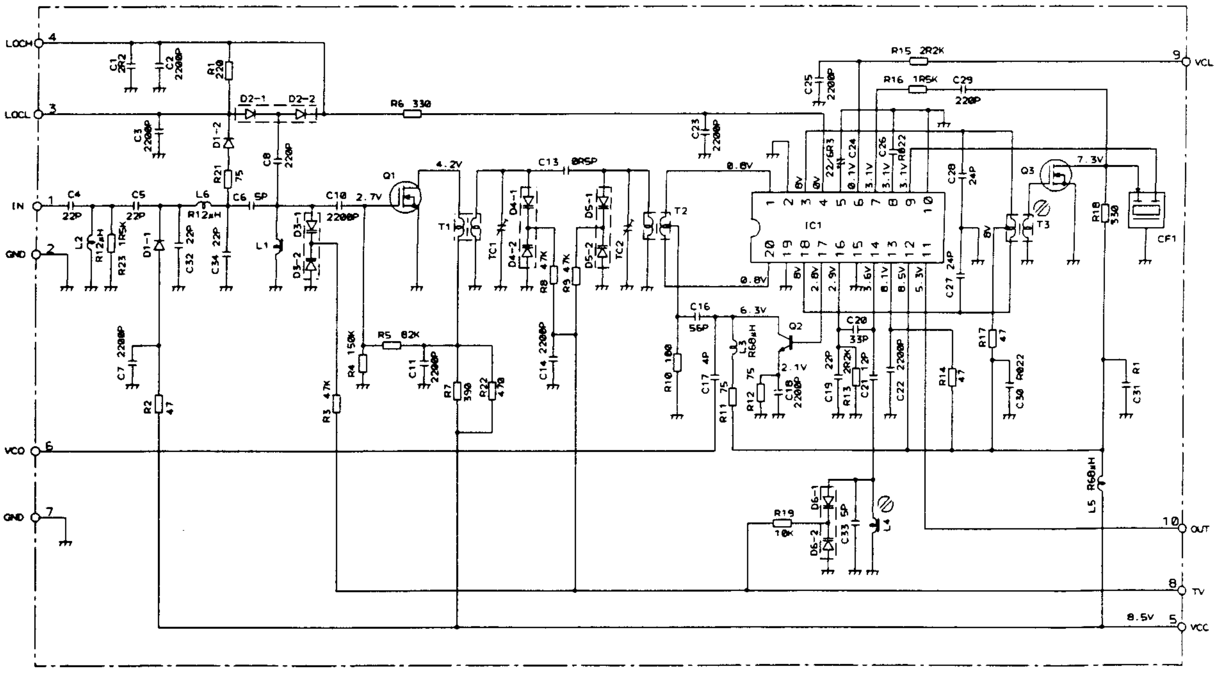

C49
C45
C40
C35
C30
C25
C20
C15
C10
C5
C1
C0
C49
C45
C40
C35
C30
C25
C20
C15
C10
C6
C4
C1
C0

Fig. 12-2

● FM FRONT END (CWB1059)


LOCH
4
LOCL
3
IN
1
GND
2
VCO
6
GND
7
C1 2R2
C2 2200P
R1 220
C3 2200P
D2-1
D2-2
D1-2
R21 75
C8 220P
R6 330
C4 22P
C5 22P
L6 R12μH
C6 5P
L2 R12μH
R23 1R5K
D1-1
C32 22P
C34 22P
L1
D3-1
D3-2
C10 2200P
2.7V
Q1
4.2V
C13 0R5P
T1
TC1
D4-1
D4-2
R8 47K
R9 47K
D5-1
D5-2
TC2
T2
C7 2200P
R2 47
R3 47K
R4 150K
R5 82K
C11 2200P
R7 390
R22 470
C14 2200P
C23 2200P
0.8V
0.8V
C25 2200P
R15 2R2K
R16 1R5K
C29 220P
22/6R3
C24
C26
R022
0V
0V
0.1V
3.1V
3.1V
3.1V
IC1
1
2
3
4
5
6
7
8
9
10
20
19
18
17
16
15
14
13
12
11
0V
2.8V
2.9V
3.6V
8.1V
8.5V
5.3V
C28 24P
C27 24P
0V
Q3
T3
7.3V
R18 330
CF1
9
VCL
C16 56P
6.3V
Q2
L3 R68μH
2.1V
R10 100
C17 4P
R11 75
R12 75
C18 2200P
C19 22P
R13 2R2K
C20 33P
C21 12P
C22 2200P
R14 47
R17 47
C30 R022
C31 R1
L5 R68μH
R19 10K
D6-1
D6-2
C33 5P
L4
10
OUT
8
TV
8.5V
5
VCC

NOTE:

—▭— Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

—|⊢ Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

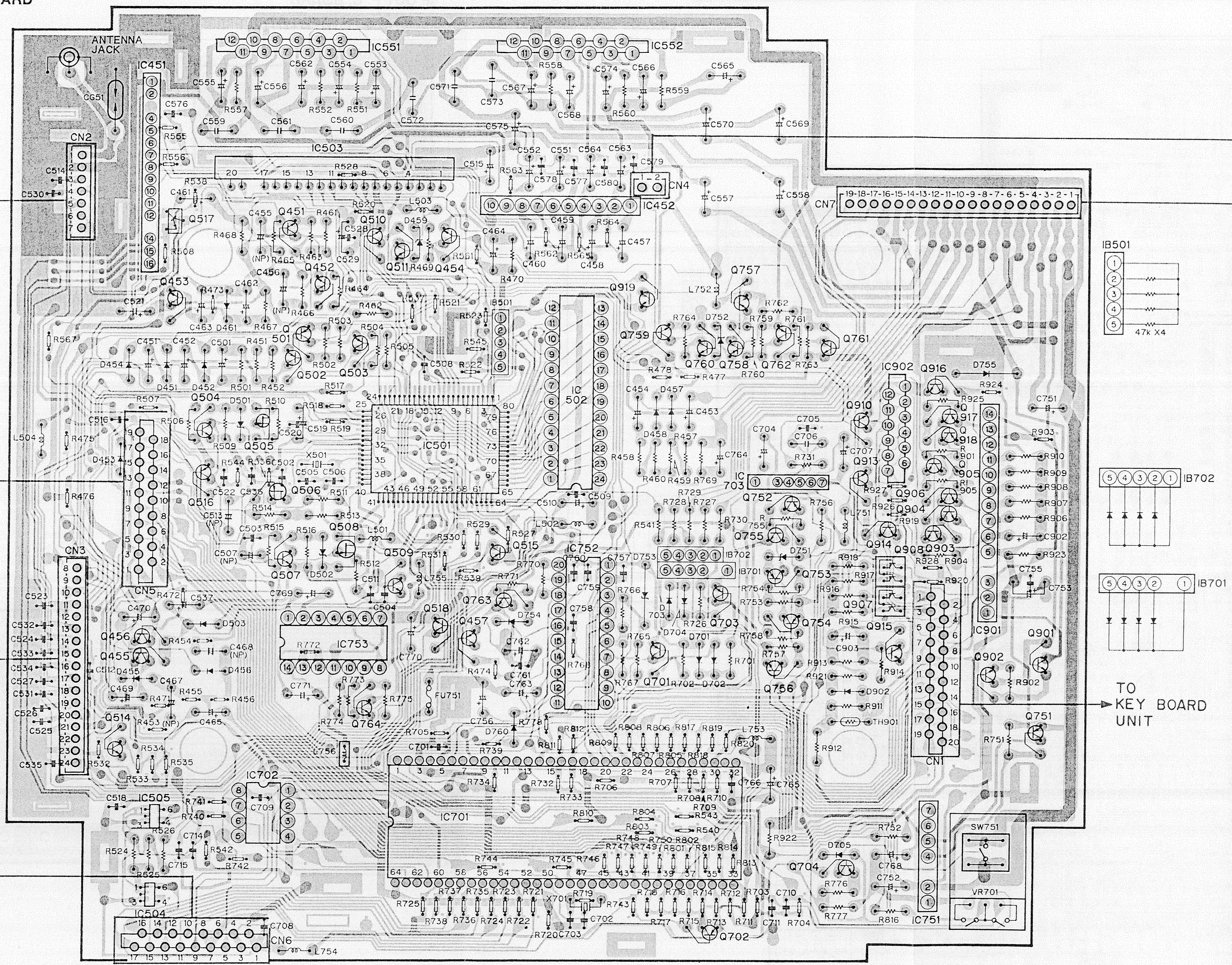
Decimal points for resistor and capacitor fixed values are expressed as
2.2→2R2
0.022→R022

Fig. 13

10. CONNECTION DIAGRAM

IC, Q																									
	Q514	IC451 Q456 Q455	Q517 Q453 IC505 IC504	Q504 Q516	Q505 Q506 IC702	Q502 Q451 Q501 Q507	IC551 Q508 IC753 Q452	IC503 Q510 Q503 Q764	IC501 Q509 Q511	IC701 Q454 Q518	Q515 Q457	IC452 Q763	IC552 IC502	IC752	Q919 Q701	Q702 Q759	IC703 Q703 Q760	Q762 Q755 Q757 Q758	Q752 Q753 Q754 Q756	Q704 Q761	Q907 Q910 Q913	Q908 IC902 Q915 Q914	Q916 Q906 Q903 IC751	Q917 Q918 Q905 Q904	Q902 IC901	Q901 Q751

MOTHER P. C. BOARD


ANTENNA JACK
CN2
IC451
IC551
IC552
IC503
CN4
IC452
CN7
IB501
47k X4
IC502
IC501
CN5
CN3
IC753
IC752
IC703
IC701
IC702
IC505
IC504
CN6
IC902
IC901
CN1
IB702
IB701
SW751
VR701
IC751

TO TUNER P.C. BOARD

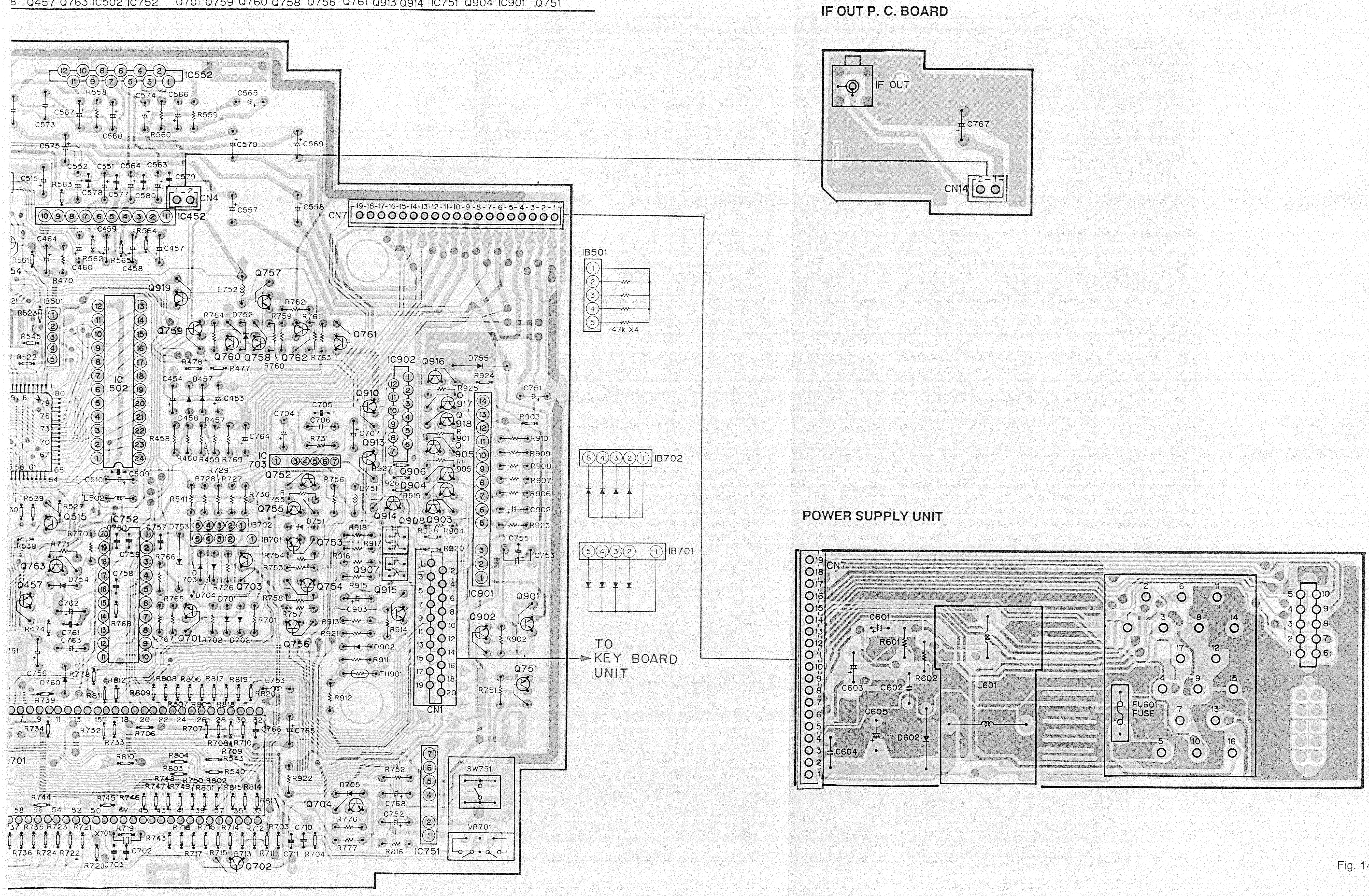
TO DECK UNIT & CASSETTE MECHANISM ASSY

TO TUNER P.C. BOARD

TO LCD UNIT

TO KEY BOARD UNIT

IC701 Q762 Q752 Q908 Q916 Q917
54 Q515 IC452 IC552 IC703 Q755 Q753 Q907 IC902 Q906 Q918
8 Q457 Q763 IC502 IC752 Q919 Q702 Q703 Q757 Q754 Q704 Q910 Q915 Q903 Q905 Q902 Q901
Q701 Q759 Q760 Q758 Q756 Q761 Q913 Q914 IC751 Q904 IC901 Q751



IF OUT P. C. BOARD

POWER SUPPLY UNIT

IC552
IC452
CN4
CN7
IB501
47k X4
IC 502
IC 703
IC752
IB702
IB701
IC902
IC901
CN1
IC751
SW751
VR701
TO KEY BOARD UNIT
IF OUT
C767
CN14
CN7
C601
R601
R602
C602
C603
C605
C604
D602
L601
FU601 FUSE

Fig. 14

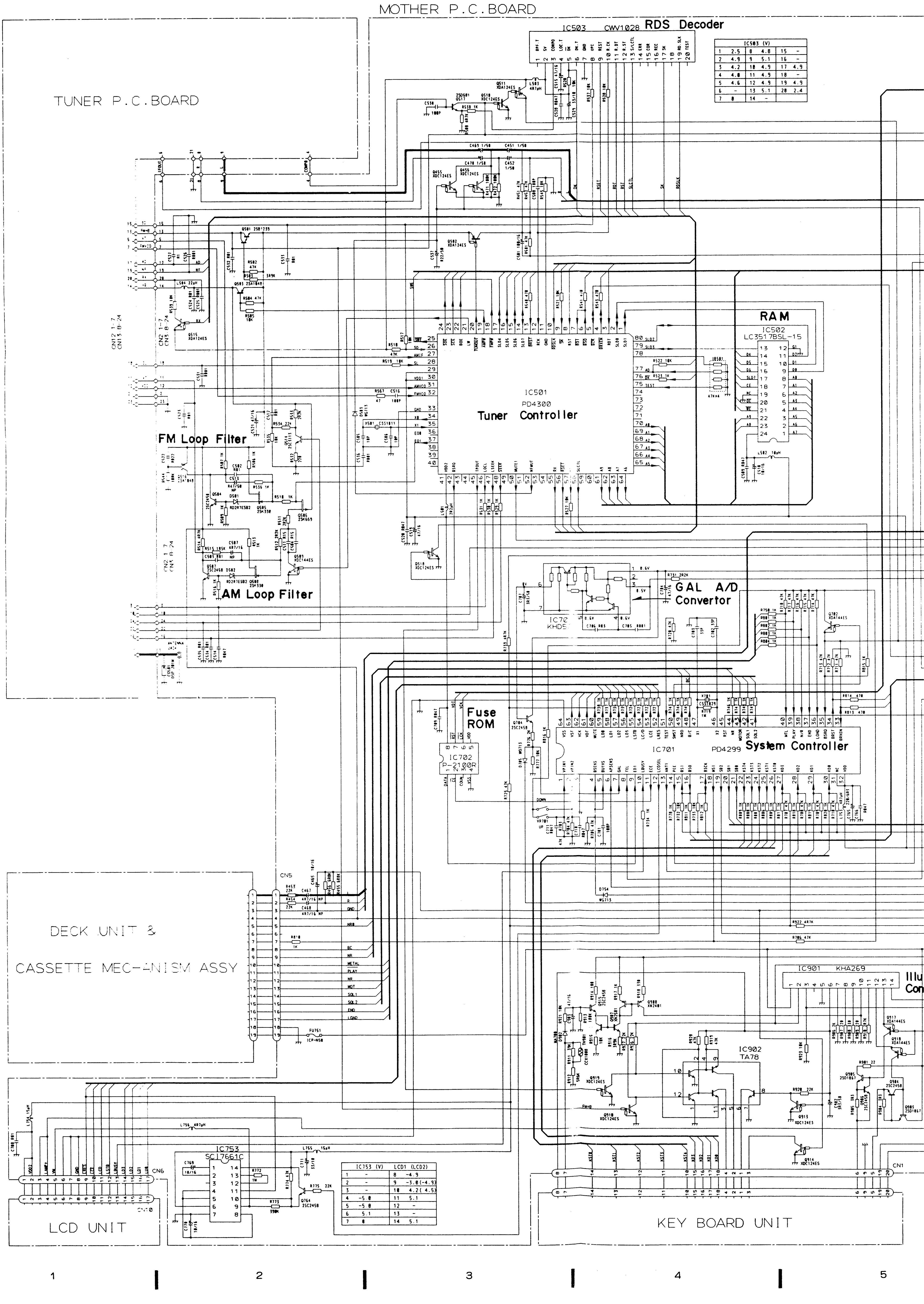
A

B

C

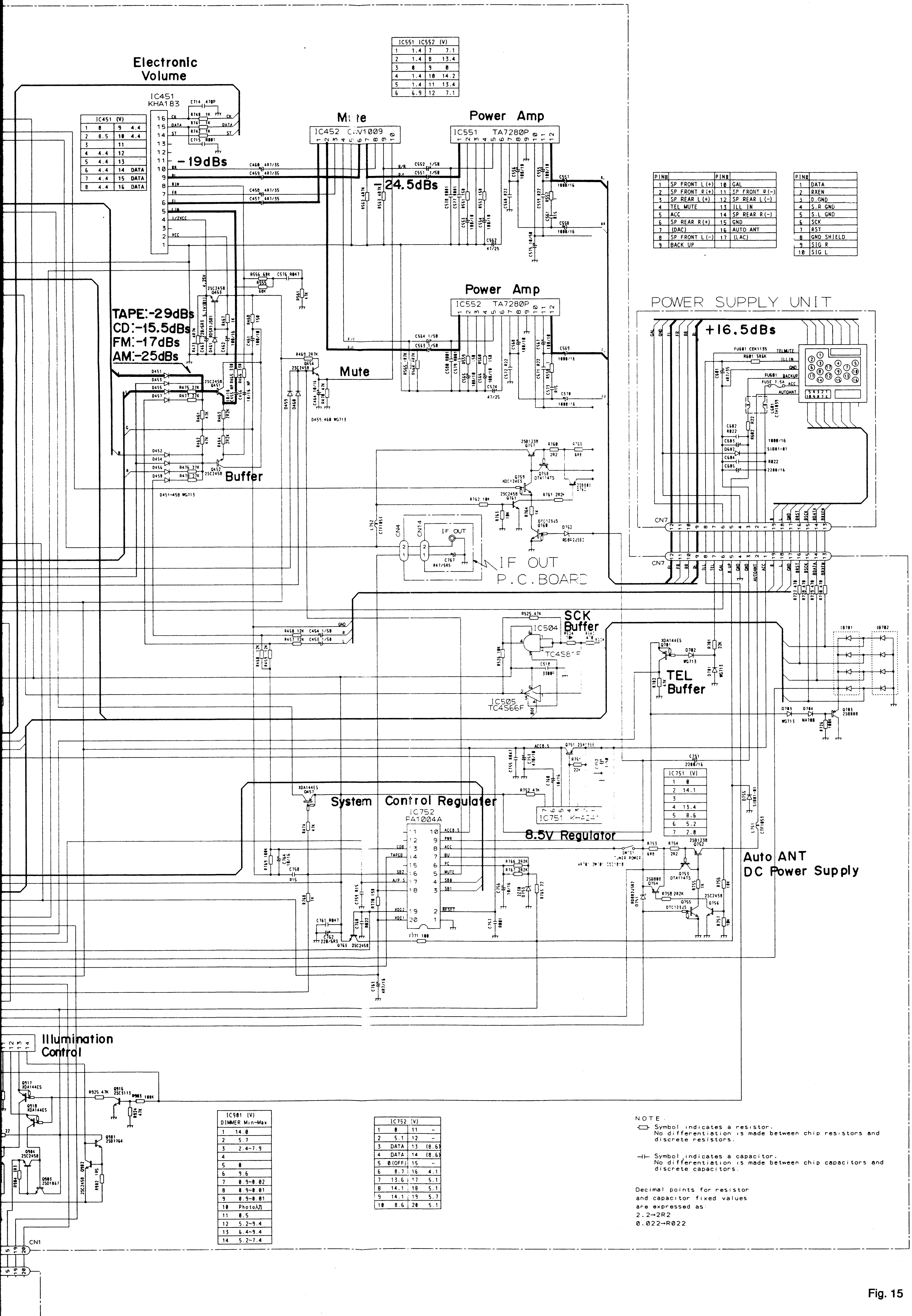
D

11. SCHEMATIC CIRCUIT DIAGRAM


MOTHER P.C.BOARD
TUNER P.C.BOARD
IC503 CWV1028 RDS Decoder
RAM
IC502
LC3517BSL-15
IC501
PD4300
Tuner Controller
FM Loop Filter
AM Loop Filter
GAL A/D Convertor
IC70
KHD5
Fuse ROM
IC702
P-2100R
IC701
PD4299 System Controller
DECK UNIT &
CASSETTE MECHANISM ASSY
CN5
IC901 KHA269
IC902
TA78
IC753
SC17661C
CN6
LCD UNIT
CN1
KEY BOARD UNIT
1
2
3
4
5

IC503 (V)					
1	2.5	8	4.8	15	-
2	4.9	9	5.1	16	-
3	4.2	10	4.9	17	4.9
4	4.0	11	4.9	18	-
5	4.6	12	4.9	19	4.9
6	-	13	5.1	20	2.4
7	0	14	-		

IC753 (V)		LCD1 (LCD2)	
1	-	8	-4.9
2	-	9	-3.0(-4.9)
3	-	10	4.2(4.5)
4	-5.0	11	5.1
5	-5.0	12	-
6	5.1	13	-
7	0	14	5.1


Electronic Volume
IC451 KHA183
-19dBs
Mute
IC452 CXV1009
Power Amp
IC551 TA7280P
24.5dBs
Power Amp
IC552 TA7280P
TAPE:-29dBs
CD:-15.5dBs
FM:-17dBs
AM:-25dBs
Mute
Buffer
POWER SUPPLY UNIT
+16.5dBs
IF OUT
IF OUT P.C.BOARD
CN4
CN14
CN7
SCK Buffer
IC504 TC4S66F
IC505 TC4S66F
TEL Buffer
System Control Regulater
IC752 PA1004A
IC751 KHA241
8.5V Regulator
Auto ANT DC Power Supply
Illumination Control
CN1
A
B
C
D
E
F
5
6
7
8
9

IC551 IC552 (V)			
1	1.4	7	7.1
2	1.4	8	13.4
3	0	9	0
4	1.4	10	14.2
5	1.4	11	13.4
6	6.9	12	7.1

IC451 (V)			
1	0	9	4.4
2	8.5	10	4.4
3		11	
4	4.4	12	
5	4.4	13	
6	4.4	14	DATA
7	4.4	15	DATA
8	4.4	16	DATA

PIN#		PIN#	
1	SP FRONT L (+)	10	GAL
2	SP FRONT R (+)	11	SP FRONT R (-)
3	SP REAR L (+)	12	SP REAR L (-)
4	TEL MUTE	13	ILL IN
5	ACC	14	SP REAR R (-)
6	SP REAR R (+)	15	GND
7	(DAC)	16	AUTO ANT
8	SP FRONT L (-)	17	(LAC)
9	BACK UP		

PIN#	
1	DATA
2	RXEN
3	D.GND
4	S.R GND
5	S.L GND
6	SCK
7	RST
8	GND SHIELD
9	SIG R
10	SIG L

IC751 (V)	
1	0
2	14.1
3	
4	13.4
5	8.6
6	5.2
7	2.0

IC901 (V) DIMMER Min~Max	
1	14.0
2	5.7
3	2.4~7.9
4	
5	0
6	9.6
7	0.9~0.02
8	0.9~0.01
9	0.9~0.01
10	Photo入力
11	0.5
12	5.2~9.4
13	6.4~9.4
14	5.2~7.4

IC752 (V)			
1	0	11	-
2	5.1	12	-
3	DATA	13	(8.6)
4	DATA	14	(8.6)
5	0 (OFF)	15	-
6	8.7	16	4.1
7	13.6	17	5.1
8	14.1	18	5.1
9	14.1	19	5.7
10	8.6	20	5.1

NOTE:

-▭- Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

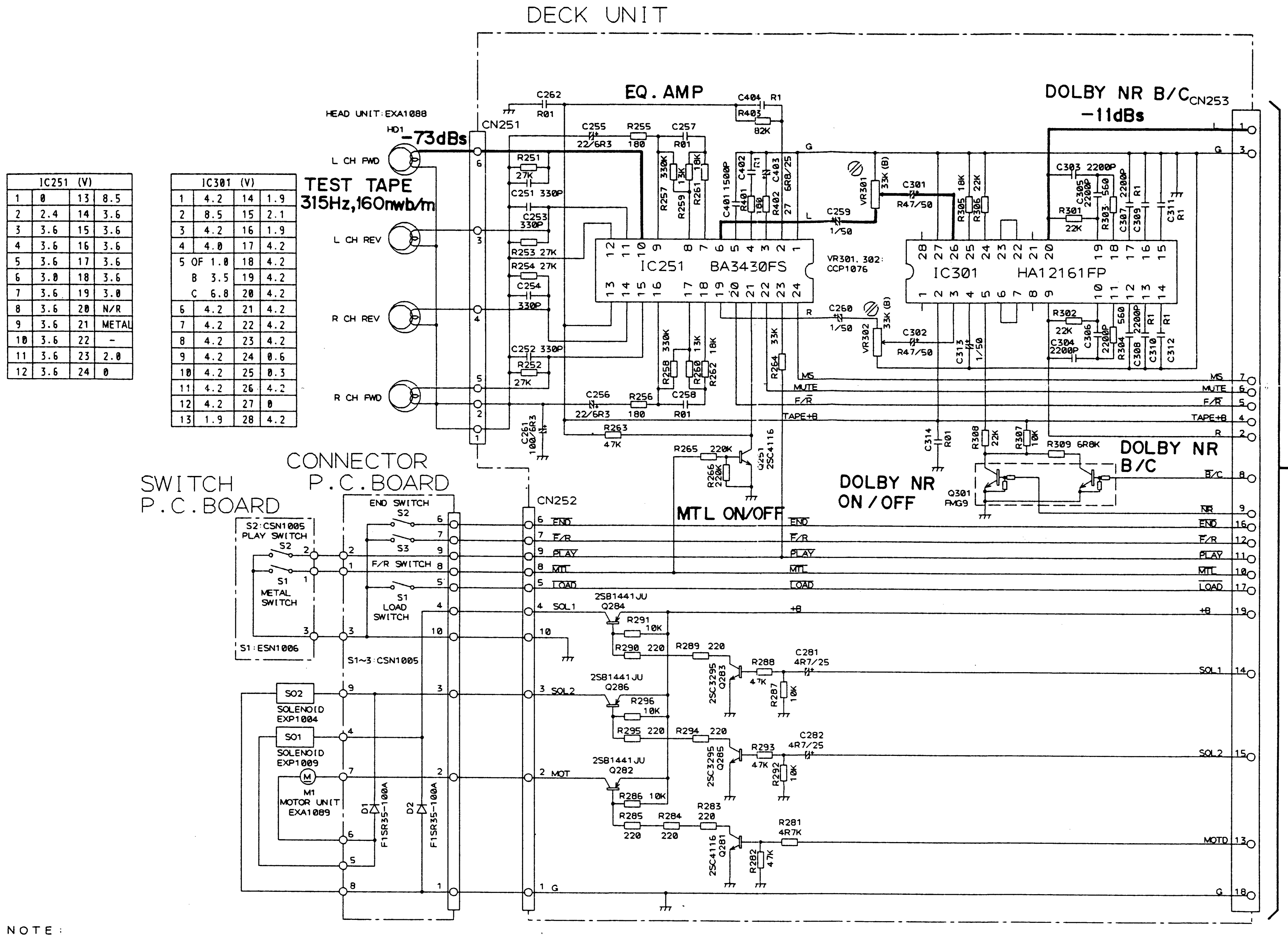
-||- Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor
and capacitor fixed values
are expressed as:
2.2→2R2
0.022→R022

Fig. 15

12. CIRCUIT DIAGRAM AND P. C. BOARD PATTERN

● DECK UNIT AND CASSASSETTE MECHANISM ASSY


DECK UNIT
EQ. AMP
HEAD UNIT:EXA1088
HD1
-73dBs
TEST TAPE
315Hz,160nwb/m
L CH FWD
L CH REV
R CH REV
R CH FWD
CN251
IC251 BA3430FS
IC301 HA12161FP
VR301, 302: CCP1076
DOLBY NR B/C
CN253
-11dBs
DOLBY NR ON / OFF
DOLBY NR B/C
Q301 FMG9
MTL ON/OFF
Q251 2SC4116
CONNECTOR P.C. BOARD
SWITCH P.C. BOARD
S2:CSN1005 PLAY SWITCH
S1 METAL SWITCH
S1:ESN1006
END SWITCH S2
S3
F/R SWITCH
S1 LOAD SWITCH
S1~3:CSN1005
CN252
SO2 SOLENOID EXP1004
SO1 SOLENOID EXP1009
M1 MOTOR UNIT EXA1089
D1 F1SR35-100A
D2 F1SR35-100A
2SB1441JU Q284
2SB1441JU Q286
2SB1441JU Q282
2SC3295 Q283
2SC3295 Q285
2SC4116 Q281
MS
MUTE
F/R
TAPE+B
B/C
NR
END
PLAY
MTL
LOAD
+B
SOL1
SOL2
MOTD
MOT
G
L
R

IC251 (V)			
1	0	13	8.5
2	2.4	14	3.6
3	3.6	15	3.6
4	3.6	16	3.6
5	3.6	17	3.6
6	3.0	18	3.6
7	3.6	19	3.0
8	3.6	20	N/R
9	3.6	21	METAL
10	3.6	22	-
11	3.6	23	2.0
12	3.6	24	0

IC301 (V)			
1	4.2	14	1.9
2	8.5	15	2.1
3	4.2	16	1.9
4	4.0	17	4.2
5 OF	1.0	18	4.2
B	3.5	19	4.2
C	6.8	20	4.2
6	4.2	21	4.2
7	4.2	22	4.2
8	4.2	23	4.2
9	4.2	24	0.6
10	4.2	25	0.3
11	4.2	26	4.2
12	4.2	27	0
13	1.9	28	4.2

NOTE:

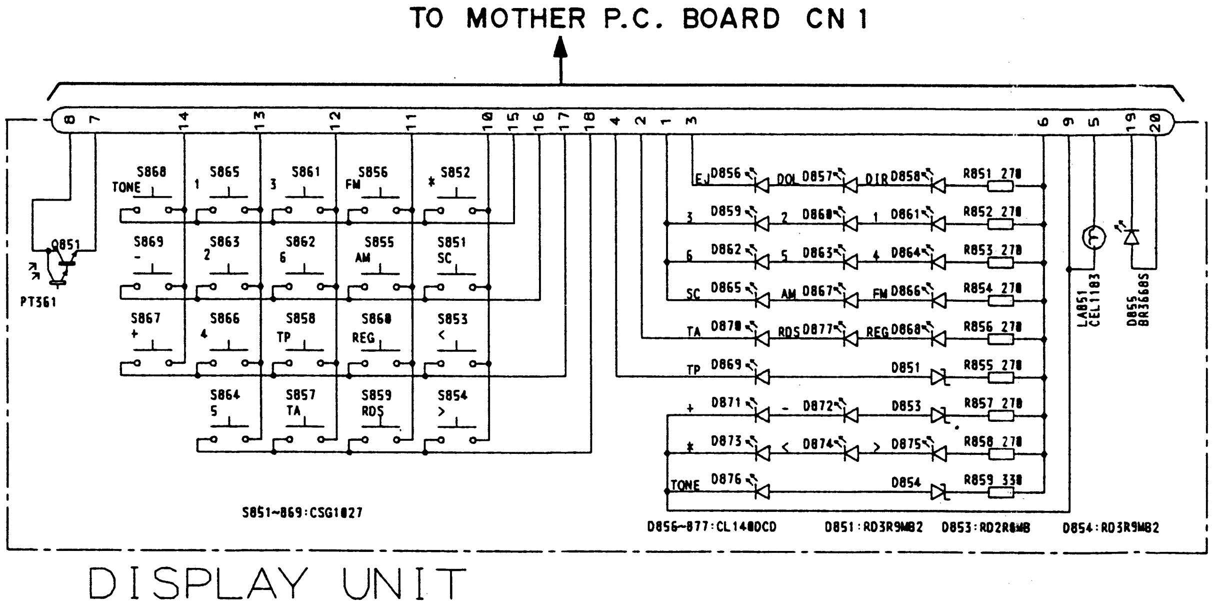
-▭- Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

-||- Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor
and capacitor fixed values
are expressed as:
2.2→2R2
0.022→R022

Fig. 16

● KEY BOARD UNIT


TO MOTHER P.C. BOARD CN 1
DISPLAY UNIT
Q851
PT361
S868 TONE
S865 1
S861 3
S856 FM
S852 *
S869 -
S863 2
S862 6
S855 AM
S851 SC
S867 +
S866 4
S858 TP
S860 REG
S853 <
S864 5
S857 TA
S859 RDS
S854 >
S851~869:CSG1027
D856~877:CL140DCD
D851:RD3R9MB2
D853:RD2R0MB
D854:RD3R9MB2
LA851 CEL1183
D855 BR3660S
R851 270
R852 270
R853 270
R854 270
R856 270
R855 270
R857 270
R858 270
R859 330

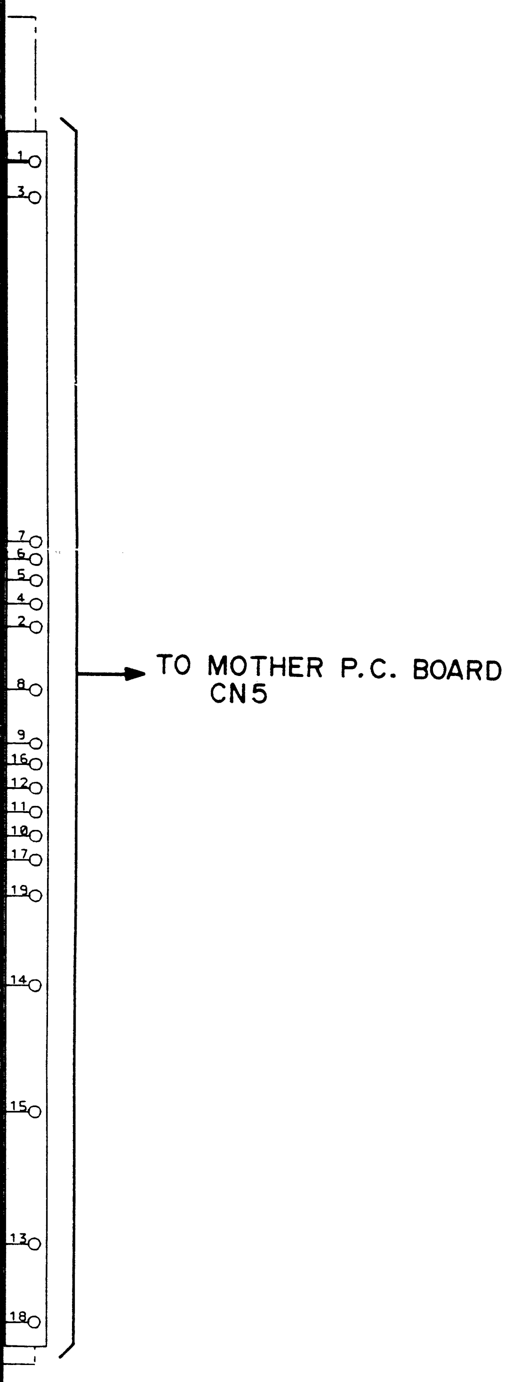
NOTE:

-▭- Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

-||- Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor
and capacitor fixed values
are expressed as:
2.2→2R2
0.022→R022

Fig. 18


1
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7
6
5
4
2
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9
16
12
11
10
17
19
14
15
13
18
TO MOTHER P.C. BOARD CN5

ig. 16

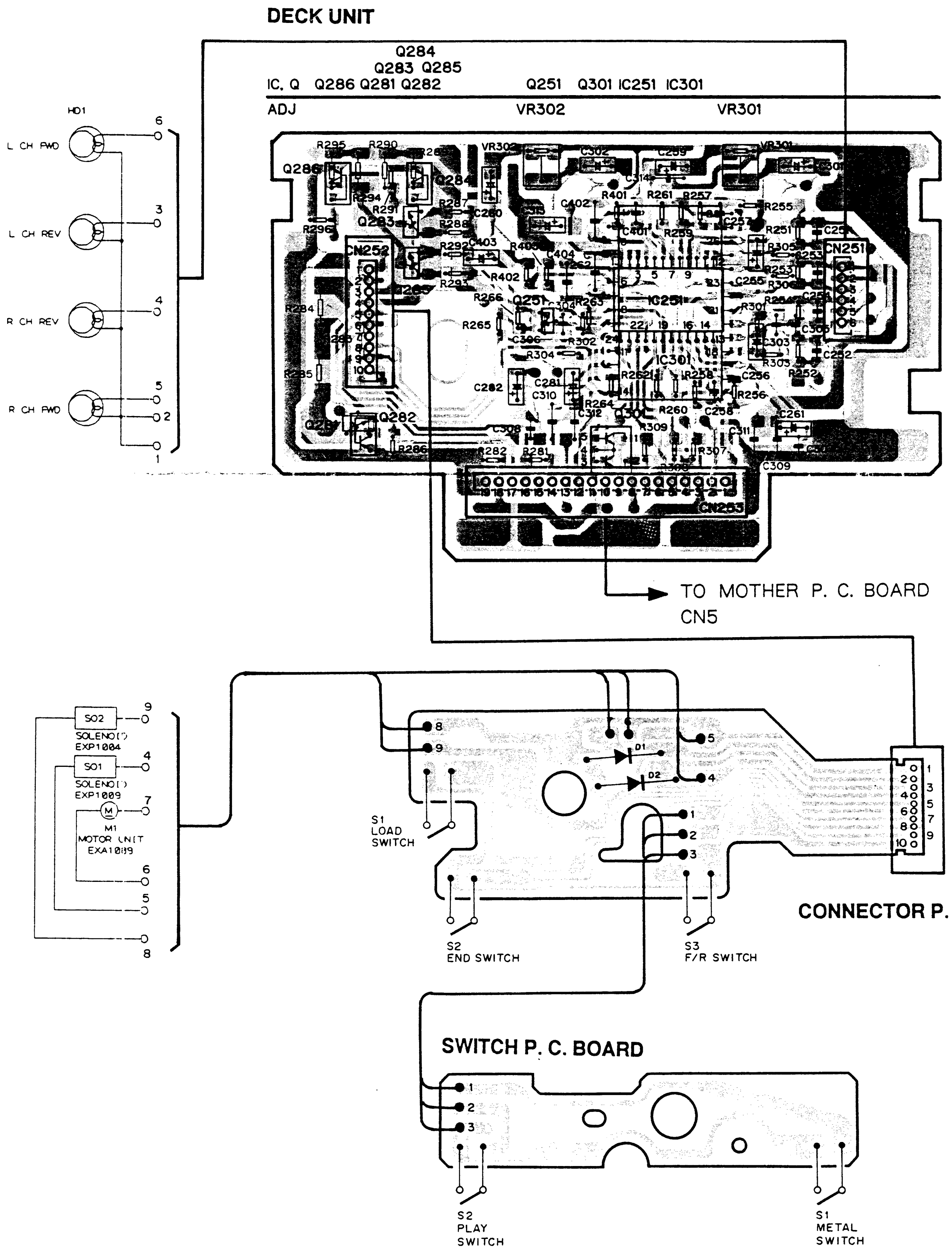

DECK UNIT
Q284
Q283 Q285
IC, Q Q286 Q281 Q282
Q251 Q301 IC251 IC301
ADJ
VR302
VR301
H01
L CH FWD
L CH REV
R CH REV
R CH FWD
6
3
4
5
2
1
CN252
CN251
CN253
IC251
IC301
TO MOTHER P. C. BOARD CN5
S02
SOLENOID
EXP1004
S01
SOLENOID
EXP1009
M1
MOTOR UNIT
EXA1019
9
4
7
6
5
8
D1
D2
S1
LOAD
SWITCH
S2
END SWITCH
S3
F/R SWITCH
CONNECTOR P. C. BOARD
SWITCH P. C. BOARD
S2
PLAY
SWITCH
S1
METAL
SWITCH

Fig. 17

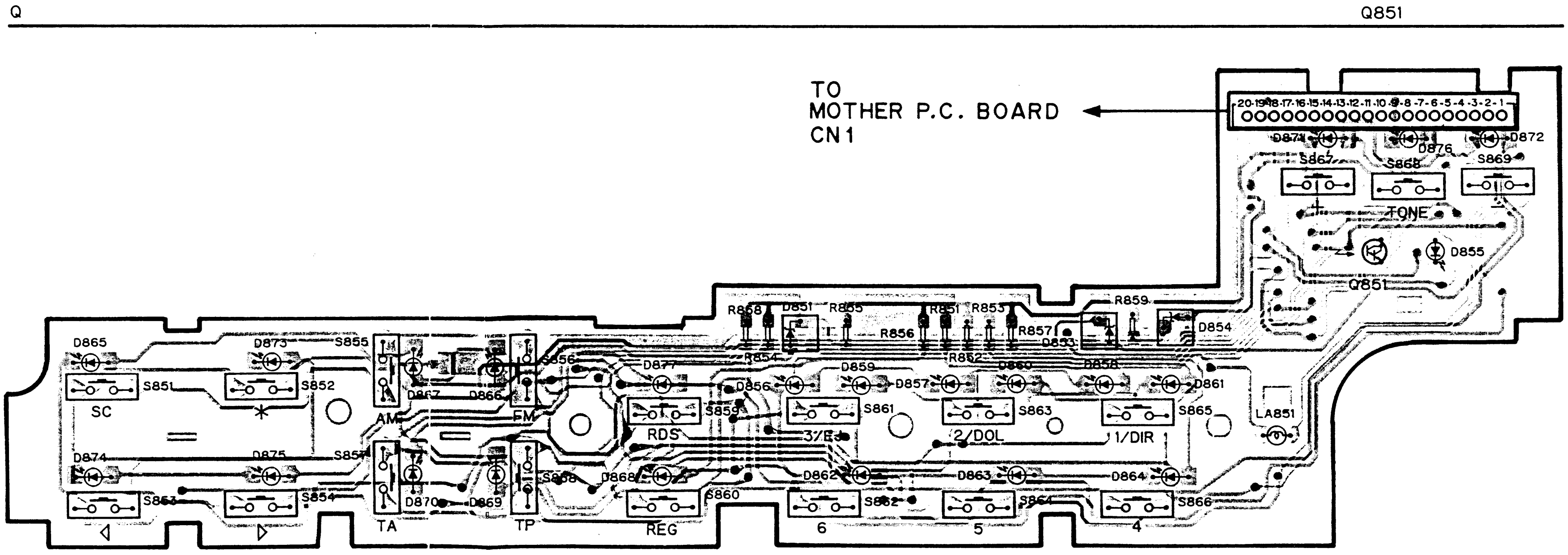
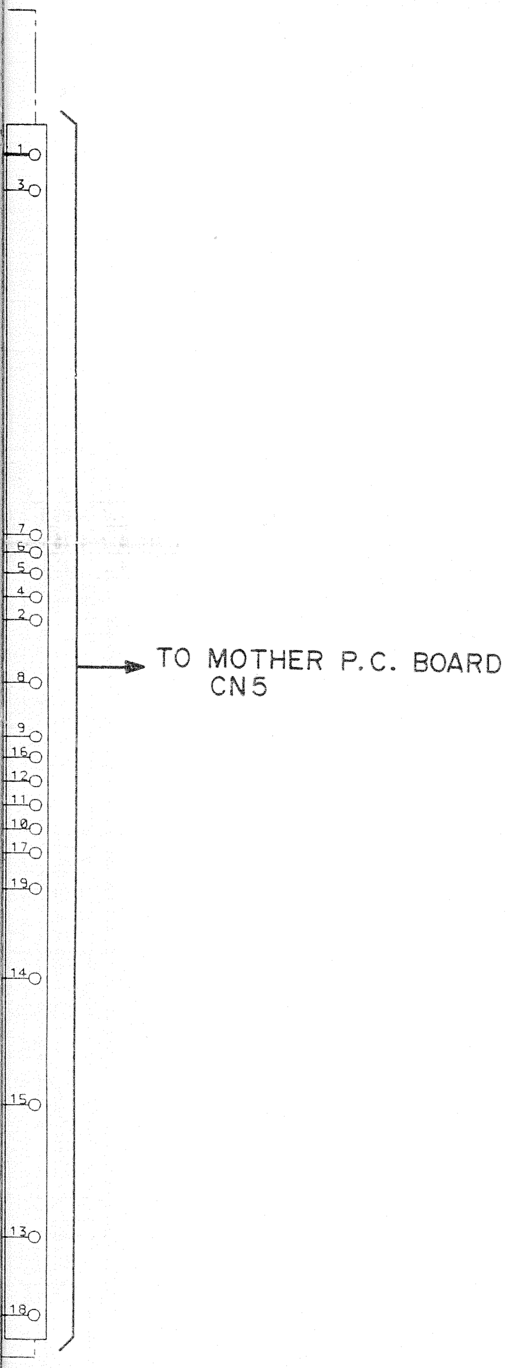
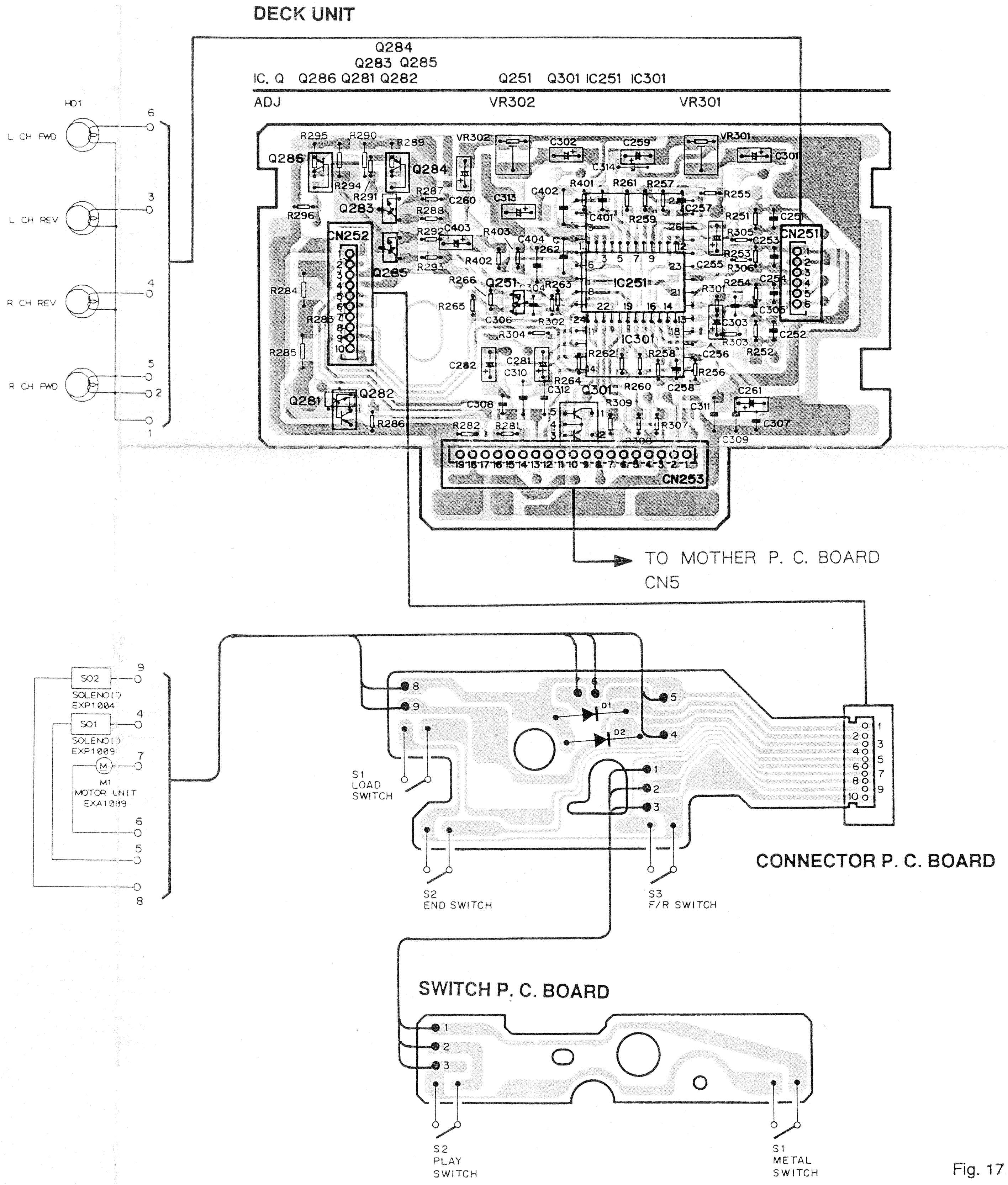

Q
Q851
TO
MOTHER P.C. BOARD
CN1
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
D871
D876
D872
S867
S868
S869
TONE
D855
Q851
R858
D851
R855
R851
R853
R856
R857
R859
D853
D854
R854
R852
D865
D873
S855
S851
S852
SC
AM
FM
D867
D866
S856
D877
D859
D860
D858
D856
D857
D861
S859
S861
S863
S865
RDS
3/EJ
2/DOL
1/DIR
LA851
D874
D875
S857
S858
D868
D862
D863
D864
S853
S854
D870
D869
S860
S862
S864
S866
TA
TP
REG
6
5
4

Fig. 19



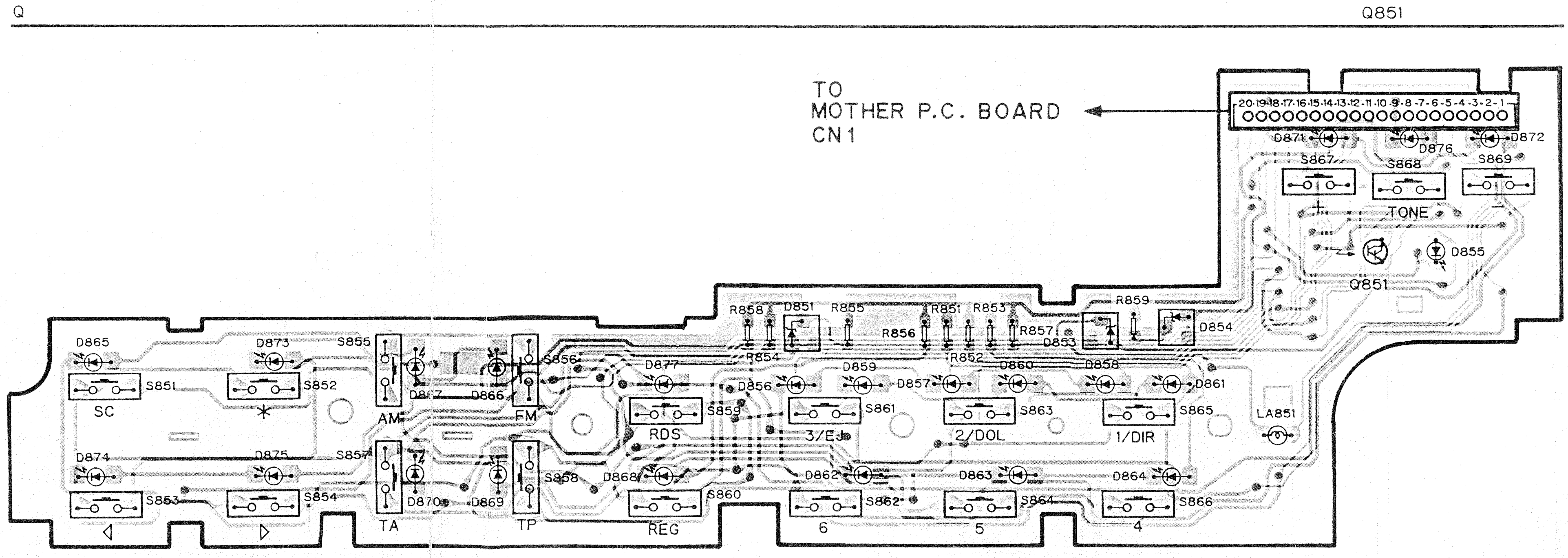
TO MOTHER P.C. BOARD CN5

Fig. 16



DECK UNIT
IC, Q
Q284
Q283 Q285
Q286 Q281 Q282
Q251 Q301 IC251 IC301
ADJ
VR302
VR301
H01
L CH FWD
L CH REV
R CH REV
R CH FWD
CN252
CN251
CN253
IC251
IC301
TO MOTHER P. C. BOARD CN5
S02
SOLENOID
EXP1004
S01
SOLENOID
EXP1009
M1
MOTOR UNIT
EXA1089
S1
LOAD
SWITCH
S2
END SWITCH
S3
F/R SWITCH
D1
D2
CONNECTOR P. C. BOARD
SWITCH P. C. BOARD
S2
PLAY
SWITCH
S1
METAL
SWITCH

Fig. 17



Q
Q851
TO
MOTHER P.C. BOARD
CN1
D871
D876
D872
S867
S868
S869
TONE
D855
Q851
R858
D851
R855
R856
R851
R853
R857
D853
R859
D854
R854
R852
D865
D873
S855
S856
D877
D859
D860
D858
S851
S852
D867
D866
D856
D857
D861
SC
AM
FM
S859
S861
S863
S865
LA851
RDS
3/EJ
2/DOL
1/DIR
D874
D875
S857
S858
D868
D862
D863
D864
S853
S854
D870
D869
S860
S862
S864
S866
TA
TP
REG
6
5
4

Fig. 19

● TUNER P. C. BOARD

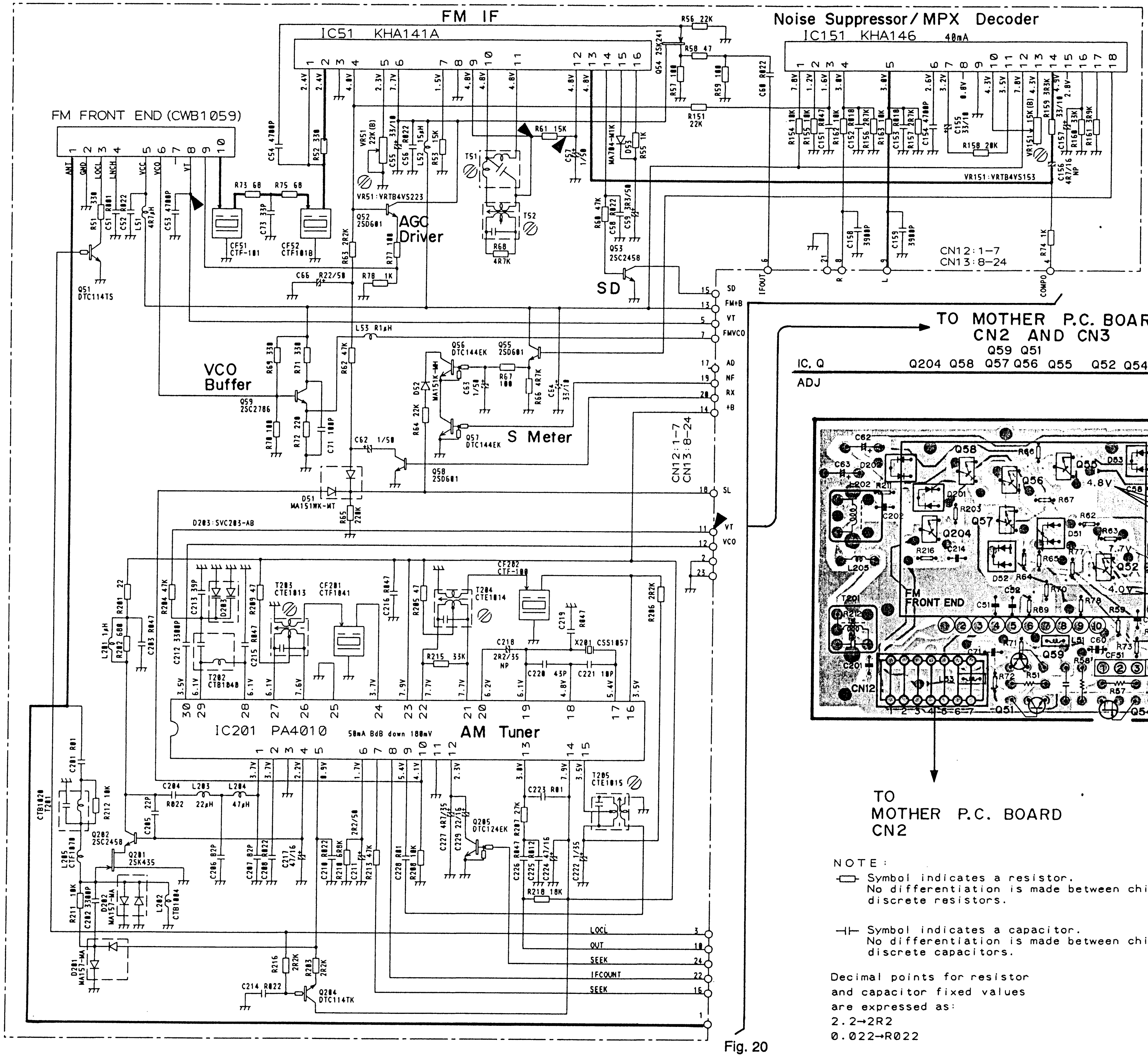

FM IF
IC51 KHA141A
Noise Suppressor / MPX Decoder
IC151 KHA146
FM FRONT END (CWB1059)
ANT
GND
LOCL
LNCH
VCC
VCO
VT
AGC Driver
Q52 2SD601
SD
Q53 2SC2458
VCO Buffer
Q59 2SC2786
S Meter
Q56 DTC144EK
Q55 2SD601
Q57 DTC144EK
Q58 2SD601
Q51 DTC114TS
CF51 CTF-101
CF52 CTF101B
T51
T52
VR51: VRTB4VS223
VR151: VRTB4VS153
CN12: 1-7
CN13: 8-24
SD
FM+B
VT
FMVCO
AD
NF
RX
+B
SL
VT
VCO
IFOUT
R
L
COMPO
D51 MA151WK-MT
D203: SVC203-AB
IC201 PA4010
AM Tuner
T203 CTE1013
CF201 CTF1041
T204 CTE1014
CF202 CTF-100
T205 CTE1015
T202 CTB1048
X201 CSS1057
Q201 2SK435
Q202 2SC2458
Q205 DTC124EK
Q204 DTC114TK
D201 MA151-MA
D202 MA157-MA
L205 CTF1070
T201 CTB1020
LOCL
OUT
SEEK
IFCOUNT
SEEK

Fig. 20

TO MOTHER P.C. BOARD
CN2 AND CN3

IC, Q	Q59 Q51 Q204 Q58 Q57 Q56 Q55 Q52 Q54	IC51	Q53	IC151	Q201 Q202 IC201		Q205
ADJ		T52	T51 VR51	VR151	T203	T204	T205

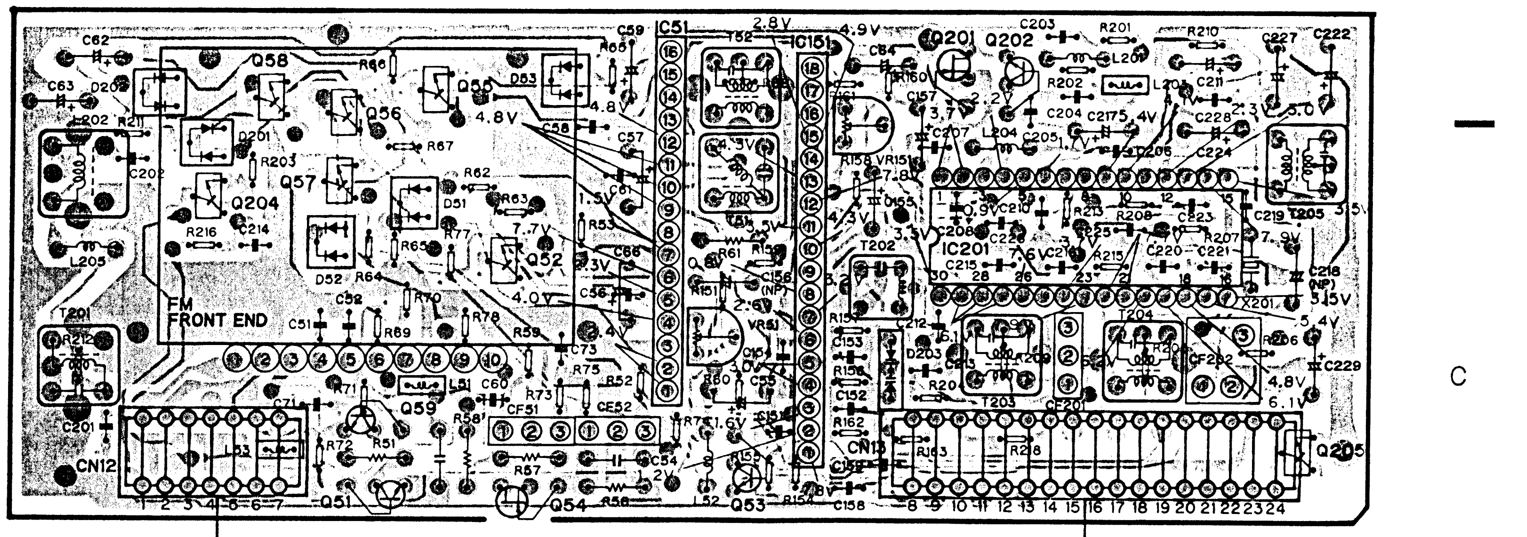

IC51
IC151
Q201
Q202
FM FRONT END
CN12
CN13
Q51
Q52
Q53
Q54
Q55
Q56
Q57
Q58
Q59
Q204
Q205
IC201
T201
T202
T203
T204
T205
4.8V
4.9V
2.8V

Fig. 21

TO
MOTHER P.C. BOARD
CN2

TO
MOTHER P.C. BOARD
CN3

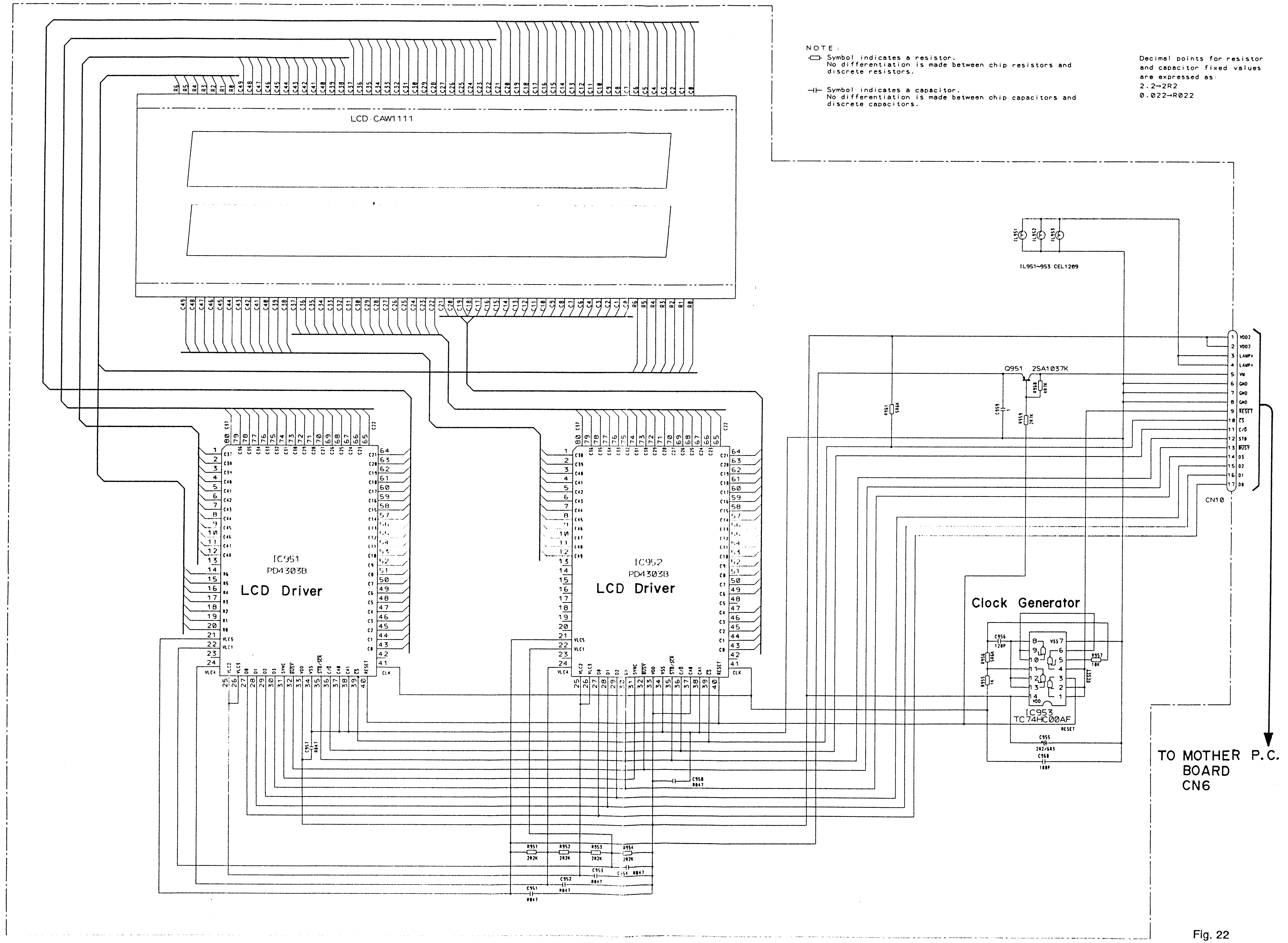
NOTE:

▭ Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

⊣⊢ Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor
and capacitor fixed values
are expressed as:
2.2→2R2
0.022→R022

● LCD UNIT


LCD CAW1111
IC951
PD4303B
LCD Driver
IC952
PD4303B
LCD Driver
Clock Generator
IC953
TC74HC00AF
Q951 2SA1037K
IL951~953 CEL1209
R951 2R2K
R952 2R2K
R953 2R2K
R954 2R2K
C951 R047
C952 R047
C953 R047
C954 R047
C955 2R2/6R3
C956 120P
C957 R047
C958 R047
C959 1
C960 100P
R955 1K
R956 5R6K
R957 10K
R959 2R7K
R960 4R7K
R961 5R6K
RESET
CN10
1 VDD2
2 VDD2
3 LAMP+
4 LAMP+
5 VM
6 GND
7 GND
8 GND
9 RESET
10 CS
11 C/D
12 STB
13 BUSY
14 D3
15 D2
16 D1
17 D0
TO MOTHER P.C. BOARD CN6

NOTE:
—▭— Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.

—||— Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

Fig. 22

LCD UNIT

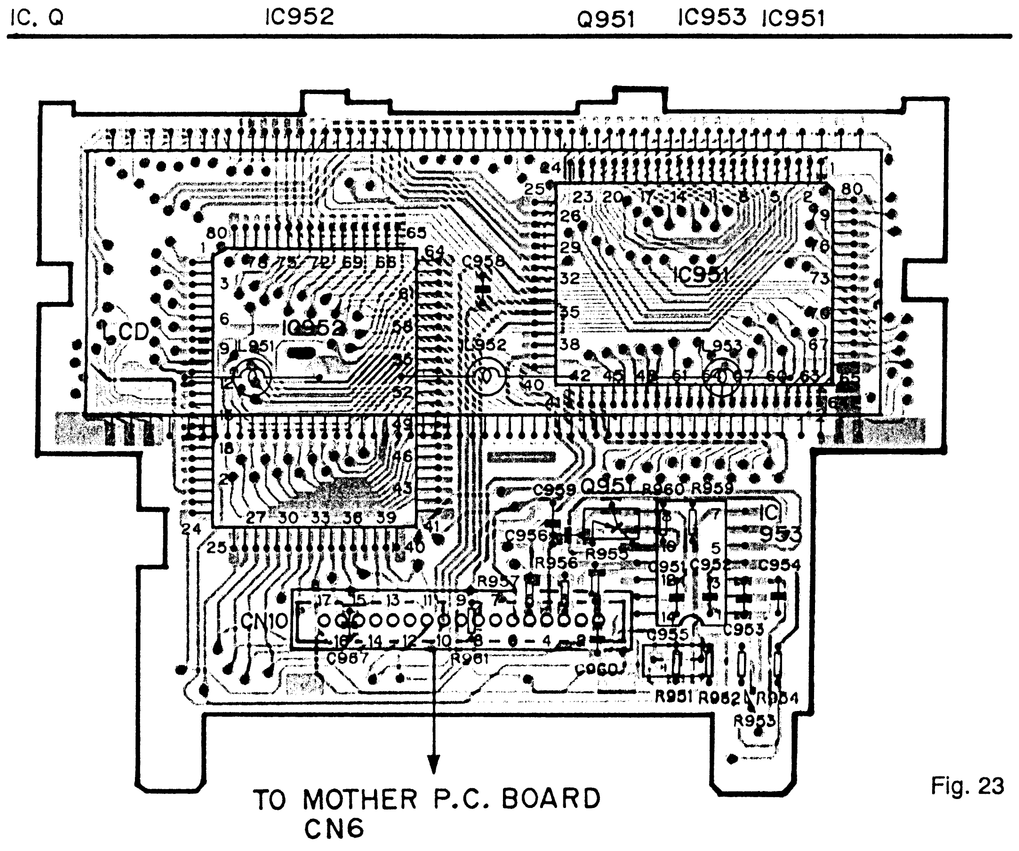


Fig. 23

The printed circuit board in the LCD unit is really divided into four layers. In the illustration, however, two layers only or front and back of the printed circuit board are shown, with the intermediate two layers omitted.

13. EXPLODED VIEW

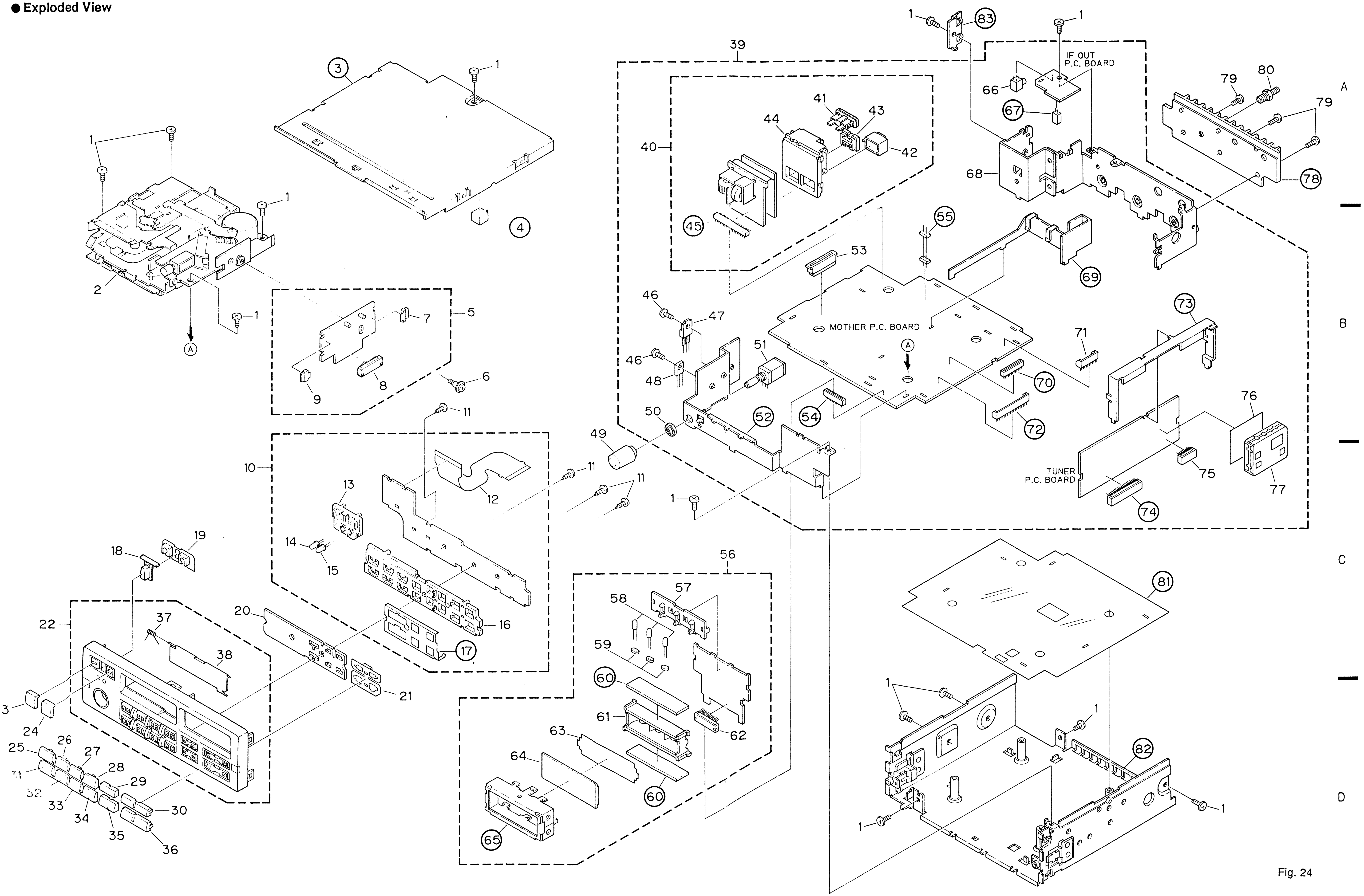
NOTE:

- *The parts marked with "●" may need long time to supply and their supply is subject to refuse as the case may be.*
- *Because the parts with encircled number shown on the dismantling drawing are not spare parts, we are unable to supply them in principle.*

● Parts List

Mark	No.	Description	Part No.
	1	Screw	BMZ26P050FMC
◉	2	Cassette Mechanism Assy	EXK1475
	3	Case Unit	CXA4087
	4	Spacer	CNM2845
◉	5	Deck Unit	CWM2582
	6	Screw	CBA1142
	7	Connector	CKS1773
	8	Connector	CKS1710
	9	Connector	CKS1771
◉	10	Key Board Unit	CWM2427
	11	Screw	BPZ26P080FMC
	12	P. C. Board	CNP2552
	13	Holder	CNV2617
	14	LED	BR3668S
	15	Photo Transistor	PT361
	16	Holder	CNV2616
	17	Plate	CNC3608
	18	Button (TONE)	CAC2708
	19	Spacer	CNM2871
	20	Spacer	CNM2870
	21	Spacer	CNM3168
	22	Grille Unit	CXA3794
	23	Button (—)	CAC2707
	24	Button (+)	CAC2706
	25	Button (1)	CAC2711
	26	Button (2)	CAC2712
	27	Button (3)	CAC2713
	28	Button (RDS)	CAC2709
	29	Button (FM AM)	CAC2717
	30	Button (∗ SC)	CAC2719
	31	Button (4)	CAC2714
	32	Button (5)	CAC2715
	33	Button (6)	CAC2716
	34	Button (REG)	CAC2710
	35	Button (TP TA)	CAC2718
	36	Button (< >)	CAC2720
	37	Spring	CBH1378
	38	Door	CAT1340
◉	39	Tuner Amp Unit	CWN2425
◉	40	Power Supply Unit	CWM2428
	41	Auto Fuse	CEK1135
	42	Connector	CKM1068
	43	Connector	CKM1067
	44	Cover	CNV2450
	45	Plug	CKS1627
	46	Screw	BMZ30P060FMC
	47	Transistor	2SD1764
	48	Transistor	2SA1358
	49	Knob (UP/DOWN)	CAA1282
	50	Nut	CBN-003
	51	Volume	CSD1018
	52	Frame	CNC3485
	53	Connector	CKS1572
	54	Connector	CKS1727
	55	Plug	CKS1822
◉	56	LCD Unit	CWM2426
	57	Holder	CNV2618
	58	Lamp	CEL1209
	59	Bush	CNV2858
	60	Connector	CNV2620
	61	Holder	CNV2619
	62	Connector	CKS1708
	63	Plate	CNM2868
	64	LCD	CAW1111
	65	Case	CNC3508
	66	Connector	CKX1012
	67	Plug	CKS1478
	68	Frame Unit	CXA3797
	69	Holder	CNC3512
	70	Plug	CKS1729
	71	Plug	CKS-646
	72	Plug	CKS-656
	73	Holder	CNC3511
	74	Connector	CKS-675
	75	Connector	CKS-665
	76	Insulator	CNM3187
	77	FM Front End	CWB1059
	78	Heat Sink	CNR1147
	79	Screw	BMZ30P060FMC
	80	Bolt	CBA1115
	81	Insulator	CNM2869
	82	Chassis Assy	CXA3796
	83	Holder	CNC3138

● Exploded View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A
IF OUT P.C. BOARD
MOTHER P.C. BOARD
TUNER P.C. BOARD

Fig. 24

14. CASSETTE MECHANISM ASSY EXPLODED VIEW

● **Parts List**

Mark	No.	Description	Part No.
	1	Spring	EBH1121
	2	Arm Unit	EXA1132
	3	Cassette Holder	ENC1165
	4	Screw	CBA1070
	5	Screw	EBA1016
	6	Spring	EBL1011
	7	Screw	HBA-175
	8	Head Unit	EXA1088
	9	Spacer	ENV1136
	10	Screw	BMZ20P025FMC
	11	Spring	EBH1145
	12	Washer	EBE1005
	13	Arm	ENC1155
	14	Spring	EBH1187
	15	Head Base Unit	EXA1115
	16	Roller	ELA1147
	17	Washer	CBF1037
	18	·····	
	19	Roller	ELA1146
	20	Spring	EBH1131
	21	Screw	BMZ20P030FMC
	22	Cover	ENC1166
	23	Lever	ENC1159
	24	Spring	EBH1183
	25	Lever	ENV1124
	26	Roller	ELA1264
	27	Washer	YE15FUC
	28	Arm	ENC1174
	29	Damper Unit	CXA3242
	30	Spring	EBH2007
	31	Lever Unit	EXA1079
	32	Lever Unit	EXA1074
	33	Roller	ELA1149
	34	Washer	CBF1038
	35	Gear	ENV1134
	36	Spring	EBH1139
	37	Arm	ENC1170
	38	Arm	ENC1148
	39	Arm	ENC1147
	40	Spring	EBH1186

Mark	No.	Description	Part No.
	41	Collar	ENV1117
	42	Spring	EBH1155
	43	Gear	ENV1116
	44	Spring	EBH1190
	45	Pinch Roller Unit	EXA1043
	46	Shaft	ELA1129
	47	Gear	ENV1113
	48	Gear	ENV1111
	49	Spring	EBH1138
	50	Spring	EBH1142
	51	Arm	ENV1138
	52	Gear	ENV1109
	53	Collar	ELA1161
	54	Gear	ENV1110
	55	Gear Unit	EXA1083
	56	Gear	ENV1112
	57	Arm Unit	EXA1075
	58	Spring	EBH2002
	59	Arm	ENC1152
	60	Arm	ENC1151
	61	Spring	EBH1136
	62	Spring	EBH2003
	63	Arm	ENC1149
	64	Spring	EBH1182
	65	Washer	HBF-120
	66	Arm	ENV1121
	67	Gear	ENV1142
	68	Lever Unit	EXA1078
	69	Spring	EBH1189
	70	Spring	EBH1153
	71	Washer	YE20FUC
	72	Arm	ENC1150
	73	Switch	CSN1005
	74	P.C.Board	ENP1023
	75	Screw	CBA-172
	76	Motor Unit	EXA1089
	77	Screw	PMS20P022FUC
	78	Solenoid	EXP1009
	79	Gear	ENV1106
	80	Chassis Unit	EXA1131

Mark	No.	Description	Part No.
	81	Screw	PMS20P025FMC
	82	Bracket	ENC1163
	83	Screw	CBA1070
	84	P.C.Board	ENP1021
	85	Screw	CBA1076
	86	Solenoid	EXP1004
	87	Spring	EBH1157
	88	Gear	ENV1108
	89	Collar	ELA1151
	90	Arm Unit	EXA1076
	91	Gear	ENV1114
	92	Spring	EBH1141
	93	Clamper	ENV1140
	94	Arm Unit	EXA1090
	95	Spring	EBH1169
	96	Arm	ENC1153
	97	Spring	EBH1140
	98	Collar	ELA1162
	99	Screw	JFZ20P045FNI
	100	Lever	ENC1158
	101	Arm Unit	EXA1099
	102	E Type Washer	CBG1003
	103	Washer	HBF-179
	104	Flywheel	ENV1128
	105	Flywheel	ENV1127

Mark	No.	Description	Part No.
	106	Belt	ENT1014
	107	Cover	ENC1167
	108	Lever	ENC1164
	109	Spring	EBH1147
	110	Lever	ENC1160
	111	Arm	ENC1156
	112	Arm Unit	EXA1111
	113	Spring	EBH1135
	114	Clamper	ENV1141
	115	Spring	EBH1151
	116	Lever	ENC1171
	117	Spring	EBH1149
	118	Spring	EBH1146
	119	Spring	EBH1148
	120	Guide Unit	EXA1100
	121	Gear	ENV1118
	122	Arm	ENC1157
	123	Spring	EBH1158
	124	Lever	ENC1161
	125	Switch(Metal)	ESN1006

● Cassette Mechanism Assy

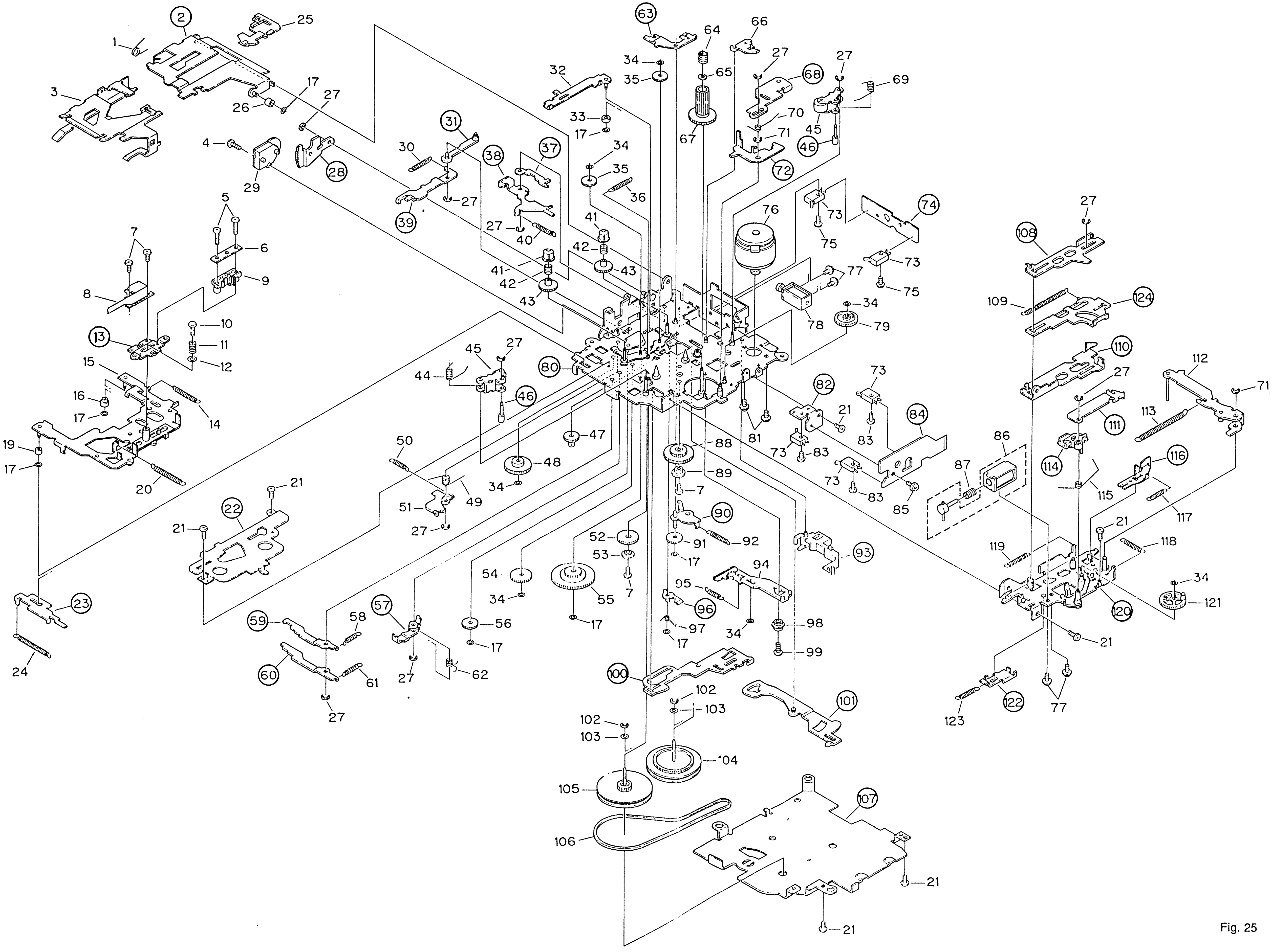
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Fig. 25

15. ELECTRICAL PARTS LIST

NOTE:

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*
  Chip Resistor
  RS1/8S□□□J, RS1/10S□□□J
  Chip Capacitor (except for CQS.....)
  CKS....., CCS....., CSZS.....

Tuner Amp Unit

Consists of
- Mother P.C. Board
- Tuner P.C. Board
- IF Out P.C. Board

Unit Number :
Unit Name : Tuner Amp Unit

MISCELLANEOUS

========= Circuit Symbol & No.	==== Part Name	Part No.
IC 51		KHA141A
IC 151		KHA146
IC 201		PA4010
IC 451		KHA183
IC 452		CWV1009
IC 501		PD4300
IC 502		LC35178SL-15
IC 503		CWV1028
IC 504		TC4S81F
IC 505		TC4S66F
IC 551 552		TA7280P
IC 701		PD4299
IC 702		P-2100R
IC 703		KHD502
IC 751		KHA241
IC 752		PA1004A
IC 753		SC17661C
IC 901		KHA269
IC 902	Transistor Array	TA78
Q 51		DTC114TS
Q 52	Chip Transistor	2SD601
Q 53 202 451 452 453		2SC2458
Q 54		2SK241
Q 55	Chip Transistor	2SD601
Q 56 57	Chip Transistor	DTC144EK
Q 58	Chip Transistor	2SD601
Q 59		2SC2786
Q 201		2SK435
Q 204	Chip Transistor	DTC114TK
Q 205	Chip Transistor	DTC124EK
Q 455 456 510 759 910		XDC124ES
Q 457 701 702 917 918		XDA144ES
Q 501		2SB1239
Q 502 511		XDA124ES
Q 503 516		2SA1048
Q 505 508		2SK330
Q 506		2SK669
Q 509		XDC144ES
Q 514 916		2SC3113
Q 515		XDA124ES
Q 517	Chip Transistor	2SD601
Q 518		XDC124ES
Q 703 754 762		2SB808
Q 704		2SC2458
Q 751		2SA1358
Q 752 757		2SB1238
Q 753 758		DTA114TS
Q 755 760		DTC123JS
Q 763 764 902 904 906		2SC2458
Q 901		2SD1764
Q 903 905		2SD1867
Q 907	Chip Transistor	XN2501
Q 908	Chip Transistor	XN2401
Q 913 914		XDC124ES
Q 915		2SC2458
Q 919		XDC124ES
D 51	Chip Diode	MA151WK-MT
D 52	Chip Diode	MA151K-MH
D 53	Chip Diode	MA704-M1K
D 201 202	Chip Diode	MA157-MR
D 203	Variable Capacitance Diode	SVC203-AB
D 451 452 453 454 455 456		WG713
D 457 458 459 460		WG713
D 461		RD5R1JSB1
D 501 502		RD2R7ESB2
D 503 701 702 703 705 754		WG713
D 704		MA700
D 751 752		RD8R2JSB2
D 753		2Z30
D 755		S1B01-01
D 902		MA700
L 51	Inductor	LPSQ4R7K
L 52 754 755	Ferri-Inductor	LAU150K
L 53	Inductor	LPSQR10K
L 201	Inductor	CTF1084
L 202	Coil	CTB1004
L 203	Inductor	LPSQ220K
L 204	Ferri-Inductor	LAU470K
L 205	Coil	CTF1070
L 501	Ferri-Inductor	LAU2R2M
L 502	Inductor	LAU100K
L 503 753	Ferri-Inductor	LAU4R7K
L 504	Ferri-Inductor	LAU220K
L 751 752	Inductor	CTF1053

Circuit Symbol & No.	Part Name	Part No.
L 756	Inductor	LPSQ4R7K
T 51	Coil	CTE1021
T 52	Coil	CTE1022
T 201	Coil	CTB1020
T 202	Coil	CTB1040
T 203	Coil	CTE1013
T 204	Coil	CTE1014
T 205	Coil	CTE1015
CG 51	Surge Protector	DSP-201M
TH 901	Thermistor	CCX1008
CF 51	Ceramic Filter	CTF1130
CF 52	Ceramic Filter	CTF-101
CF 201	Ceramic Filter	CTF1041
CF 202	Filter	CTF-100
IB 501		CWW1048
IB 701		CWW1189
IB 702		CWW1222
X 201	Crystal Resonator	CSS1057
X 501	Crystal Resonator	CSS1011
X 701	Crystal Resonator	CSS1029
VR 51	Semi-fixed 22kΩ (B)	VRTB4VS223
VR 151	Semi-fixed 15kΩ (B)	VRTB4VS153
VR 701/SW701	Volume (Up/Down, Tuner Power Switch)	CSD1018
FU 751	IC Protector	ICP-N50
	FM Front End	CWB1059
	Power Supply Unit	

RESISTORS

Circuit Symbol & No.	Part Name	Part No.
R 51		RD1/4PS331JL
R 52		RS1/10S331J
R 53		RS1/10S153J
R 55 78		RS1/10S102J
R 56 701 751 775		RD1/4PS223JL
R 57 771 914		RD1/4PS101JL
R 58		RD1/4PS470JL
R 59 67		RS1/10S101J
R 60 518 561 725		RS1/10S473J
R 61		RD1/4PS153JL
R 62 204 213 703 704 705 706 707 708 709		RS1/10S473J
R 63 203 206 216 533		RS1/10S222J
R 64 151 534 920 926 927		RS1/10S223J
R 65		RS1/10S224J
R 66 68 473 739		RS1/10S472J
R 69		RS1/10S331J
R 70		RS1/10S101J
R 71		RS1/10S331J
R 72		RS1/10S221J
R 73		RS1/10S680J
R 74 523 538 734 736 737 738 740 741 742		RS1/10S102J
R 75		RS1/10S680J
R 77		RS1/10S101J
R 154 162 163 208 211 212 517 519 521 522		RS1/10S103J
R 155		RS1/10S103J
R 156 157		RS1/10S272J
R 158		RS1/10S203J
R 159		RS1/10S332J
R 160 215		RS1/10S333J
R 161		RS1/10S392J
R 201		RS1/10S220J
R 202		RS1/10S681J
R 205 209		RS1/10S470J
R 207		RS1/10S273J
R 210		RS1/10S682J
R 218		RS1/10S183J
R 451 452 461 462 470 501 502 504		RD1/4PS473JL
R 453 454		RS1/10S223J
R 455 456		RS1/10S682J
R 457 458 459 460		RD1/4PS123JL
R 463 464 731 758 761 766 767		RD1/4PS222JL
R 465 466		RD1/4PS331JL
R 467 506 509 510 513 516 816		RD1/4PS102JL
R 468 770		RD1/4PS151JL
R 469		RD1/4PS272JL
R 471 472		RS1/10S104J
R 474		RS1/10S473J
R 475 476 477 478		RS1/10S273J
R 503		RD1/4PS392JL
R 505 524 526 756 757 762 763 923		RD1/4PS103JL
R 507 529 530 531 536 721 722 723 724 735		RS1/10S102J
R 508 562 563 564 565		RS1/10S472J
R 511 512		RD1/4PS222JL
R 514 922		RD1/4PS472JL
R 515		RD1/4PS152JL
R 520 527 535 537 539 732 733		RS1/10S103J
R 525 702 752 925		RD1/4PS473JL
R 528		RS1/10S103J
R 532		RS1/10S221J
R 540 542 543 813 814		RS1/10S471J
R 541 727 728 729 730		RD1/4PS471JL
R 544		RS1/10S104J
R 545		RS1/10S103J
R 551 552 559 560		RD1/4PS151JL
R 555 556		RS1/10S683J
R 557 558		RD1/4PS010JL
R 567		RS1/10S470J
R 710 711 712 713 714 715 716 717 718 720		RS1/10S473J
R 719 772		RS1/10S105J
R 726 769 913		RD1/4PS104JL
R 743 744 745 746 747 748 749 750 801 802		RS1/10S102J
R 753 759		RD1/4PS6R8JL
R 754 760		RD1/4PS2R2JL
R 755 764		RD1/4PS102JL
R 765 901		RD1/4PS220JL
R 768 803 804 805 806 807 808 809 810 811		RS1/10S102J
R 773		RD1/4PS394JL
R 774		RD1/4PS473JL
R 776		RD1/4PS202JL
R 777		RD1/4PS103JL
R 778 812 815 817 818 819 820		RS1/10S102J
R 902		RD1/4PS1R5JL
R 903		RS1/10S104J
R 904 905		RD1/4PS3R3JL
R 906		RD1/4PS202JL
R 907 909		RD1/4PS221JL
R 908		RD1/4PS331JL
R 910		RD1/4PS272JL
R 911		RD1/4PS393JL
R 912		RD1/4PS562JL

Circuit Symbol & No.	Part Name	Part No.
R 915		RD1/4PS103JL
R 916		RD1/4PS392JL
R 917		RD1/4PS102JL
R 918		RD1/4PS331JL
R 919 928		RS1/10S473J
R 921		RD1/4PS103JL
R 924		RS1/10S473J

CAPACITORS

Circuit Symbol & No.	Part Name	Part No.
C 51 525 526 531 705 715 757		CKSQYB102K50
C 52 56 58 60 204 208 210 214 522 760		CKSQYF223Z50
C 53 54		CKPYX472M16L
C 55 64 155 157 529 771		CEA330M10LS
C 57 62 63 451 452 453 454 469 470		CEA010M50LS2
C 59		CEA3R3M50LS
C 66 537		CEAR22M50LS2
C 71		CCSQSL101J50
C 73		CCSQCH330J50
C 151 203 509 514 520 528 576 709 710 711		CKSQYF473Z50
C 152 153		CKSQYB183J50
C 154		CKSQYB472K50
C 156 467 468		CEALNP4R7M16
C 158 159		CKSQYB392K50
C 201 223 228 532 533 534 535		CKSQYB103K50
C 202 212		CKSQYB332K50
C 205		CCSQCH220J50
C 206 207		CCSQCH820J50
C 211		CEA2R2M50LS2
C 213		CCSQCH390J50
C 215 216 219 226 755 761 766		CKSQYF473Z50
C 217 224 519 521		CEA470M16LS
C 218		CEALNP2R2M35
C 220		CCSQCH430J50
C 221 505 506		CCSQCH100D50
C 222		CSZA010M35
C 225		CKSQYB123K50
C 227		CEA4R7M35LS
C 229		CEA220M16LS
C 455 456		CEALNP100M16
C 457 458 459 460		CEA4R7M35LS
C 461		CEA101M10LS
C 462 501 756 764 768 769 770		CEA100M16LS2
C 463 762 765		CEA221M6R3LL
C 464 510		CEA100M16LS2
C 465		CEA100M16LS2
C 502 503 512 523 524 527 708		CKSQYF103Z50
C 504 511 758 759		CKSQYF154Z50
C 507	4.7μF/16V	CCH1005
C 508		CCSQSL101J50
C 513		CEALNPR47M50
C 515 704		CEA470M16LS
C 516 530		CCSQCH101J50
C 518		CKSQYB332K50
C 536 577 578 579 580		CKSQYB102K50
C 551 552 563 564		CEA010M50LS2
C 553 554 555 556 565 566 567 568		CEA101M10L2
C 557 558 569 570	1000μF/16V	CCH1057

Circuit Symbol & No.	Part Name	Part No.
C 559 560 571 572		CQMA224J50
C 561 573		CQMA154J50
C 562 574		CEA470M25L2
C 575		CEA100M50L2
C 701		CCSQSL101J50
C 702 703		CCSQCH330J50
C 706		CQMA303J50LL
C 707		CEA3R3M50LS
C 714		CCSQSL471J50
C 751		CEA222M16L2
C 752		CEA010M50LS2
C 753		CEA471M10L2
C 763		CASA4R7M16
C 767	0.47μF/5.5V	CCL1016
C 902		CEA3R3M50LS
C 903		CEA470M16LS

Unit Number :
Unit Name : LCD Unit

MISCELLANEOUS

Circuit Symbol & No.	Part Name	Part No.
IC 951 952		PD4303B
IC 953		TC74HC00AF
Q 951	Chip Transistor	2SA1037K
IL 951 952 953	Lamp 60mA 8V	CEL1209
	LCD	CAW1111

RESISTORS

Circuit Symbol & No.	Part Name	Part No.
R 951 952 953 954		RS1/10S222J
R 955		RS1/10S102J
R 956 961		RS1/10S562J
R 957		RS1/10S103J
R 959		RS1/10S272J
R 960		RS1/10S472J

CAPACITORS

Circuit Symbol & No.	Part Name	Part No.
C 951 952 953 954		CKSQYF473Z25
C 955		CSZS2R2M6R3
C 956		CCSQTH121J50
C 957 958		CKSQYB473K50
C 959		CKSYF105Z25
C 960		CCSQCH101J50

Unit Number :
Unit Name : Key Board Unit

MISCELLANEOUS

Circuit Symbol & No.	Part Name	Part No.
Q 851	Photo Transistor	PT361
D 851	Chip Diode	RD3R9MB2
D 853	Chip Diode	RD2R0MB
D 854	Chip Diode	RD3R9MB2
D 855	LED	BR3668S

Circuit Symbol & No.	Part Name	Part No.
D 856 857 858 859 860	Chip LED	CL140DCD
D 861 862 863 864 865	Chip LED	CL140DCD
D 866 867 868 869 870	Chip LED	CL140DCD
D 871 872 873 874 875	Chip LED	CL140DCD
D 876 877	Chip LED	CL140DCD
SW 851 852 853 854 855 856 857 858	Switch	CSG1027
SW 859 860 861 862 863 864 865 866	Switch	CSG1027
SW 867 868 869	Switch	CSG1027
LA 851	Lamp 60mA 8V	CEL1183
R 851 852 853 854 855 856 857 858		RS1/10S271J
R 859		RS1/10S331J

Unit Number :
Unit Name : Power Supply Unit

Circuit Symbol & No.	Part Name	Part No.
D 602		S1B01-01
L 601	Coil	CTH1039
FU 601	Fuse 7.5A	CEK1135
R 601		RD1/4PS562JL
R 602		RN1PR22JL
C 601		CEA4R7M35L2
C 602 604		CKDYF223Z50
C 603	1000μF/16V	CCH1057
C 605	2200μF/16V	CCH1001

Unit Number :
Unit Name : Deck Unit

MISCELLANEOUS

Circuit Symbol & No.	Part Name	Part No.
IC 251		BA3430FS
IC 301		HA12161FP
Q 251 281	Chip Transistor	2SC4116
Q 282 284 286	Chip Transistor	2SB1441JU
Q 283 285	Chip Transistor	2SC3295
Q 301		FMG9
VR 301 302	Semi-fixed 33kΩ (B)	CCP1076

RESISTORS

Circuit Symbol & No.	Part Name	Part No.
R 251 252 253 254		RS1/10S273J
R 255 256 401		RS1/10S181J
R 257 258		RS1/10S334J
R 259 260		RS1/10S133J
R 261 262		RS1/10S183J
R 263		RS1/10S473J
R 264		RS1/10S333J
R 265 266		RS1/10S224J
R 281		RS1/10S472J
R 282 288 293		RS1/10S473J
R 283 284 285 289 290 294 295		RS1/8S221J
R 286 291 296		RS1/10S103J
R 287 292 307		RS1/10S103J
R 301 302 306 308		RS1/10S223J
R 303 304		RS1/10S561J

Circuit Symbol & No.	Part Name	Part No.
R 305		RS1/10S183J
R 309		RS1/10S682J
R 402		RS1/10S270J
R 403		RS1/10S823J

CAPACITORS

Circuit Symbol & No.	Part Name	Part No.
C 251 252 253 254		CCSQCH331J50
C 255 256	22μF/6.3V	CCH1065
C 257 258		CKSQYB103K50
C 259 260 313	1μF/50V	CCH1072
C 261	100μF/6.3V	CCH1067
C 262		CKSYB103K50
C 281 282	4.7μF/25V	CCH1064
C 301 302	0.47μF/50V	CCH1073
C 303 304 305 306 307 308		CKSQYB222J50
C 309 310 311 312		CKSYB104K25
C 314		CKSYB103K50
C 401		CKSQYB152K50
C 402 404		CKSYB104K25
C 403	6.8μF/25V	CCH1066

Unit Number :
Unit Name : Connector P.C.Board

Circuit Symbol & No.	Part Name	Part No.
D 1 2		F1SR35-100A
S 1 2 3	Switch(LOAD.END.F/R)	CSN1005

Unit Number :
Unit Name : Switch P.C.Board

Circuit Symbol & No.	Part Name	Part No.
S 1	Switch(METAL)	ESN1006
S 2	Switch(PLAY)	CSN1005

Miscellaneous Parts List

Circuit Symbol & No.	Part Name	Part No.
HD 1	Head Unit	EXA1088
M 1	Motor Unit	EXA1089
SO 1	Solenoid	EXP1009
SO 2	Solenoid	EXP1004

PIONEER
The future of sound and vision.

Service Manual

ORDER NO.
CRT1276

CASSETTE MECHANISM ASSEMBLY

CX-175

NOTE

- This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.
- **When performing repairs use this manual together with the specific manual for the model under repair.**

Model	Service Manual	Cassette Mechanism Assembly
KEH-M5000SDK/WG KEH-M5000B/EW KEH-M5000QR/ES	CRT1236	EXK1410
KEH-M5001B/XIB	CRT1238	EXK1410
KEH-M5000QR/UC	CRT1272	EXK1410
KEH-8100SDK/WG KEH-8100B/EW KEH-8101B/XIB KEH-8150QR/ES KEH-8100QR/US	CRT1264	EXK1410
KEH-5000ZRN/XIB	CRT1286	EXK1410
KEH-M7000SDK/WG KEH-M7000B/EW	CRT1235	EXK1420
KEH-M7000QR/UC	CRT1237	EXK1420

Model	Service Manual	Cassette Mechanism Assembly
KEH-M7001B/XIB	CRT1238	EXK1420
KEH-M7000QR/CA	CRT1244	EXK1420
KEH-700QR/US KEH-8150QR/CA	CRT1264	EXK1420
KEX-M800SDK/WG KEX-M800/EW, ES, UC	CRT1234	EXK1430
KEX-M801/XIB	CRT1238	EXK1430

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911
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FT MAR. 1990 Printed in Japan

1. DISASSEMBLY

Note: Always use new washer and E washer at the time of reassembling.

• Dismounting the Cassette Holder

1. Remove the three springs.
2. Take off E washer, and then remove the arm unit.
3. Make the claw straight.
4. Shift the cassette holder toward the left and pull it out from above.

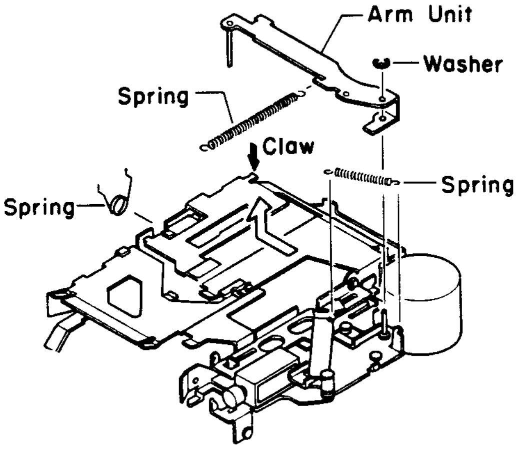
Arm Unit
Washer
Spring
Claw
Spring
Spring

Fig. 1

• Dismounting the Head Unit

1. Remove the two screws, and then remove the guide assy.
2. Remove the two screws, and then remove the head unit.

• Dismounting the Pinch Roller Unit

1. Remove the spring and then remove the pinch roller unit

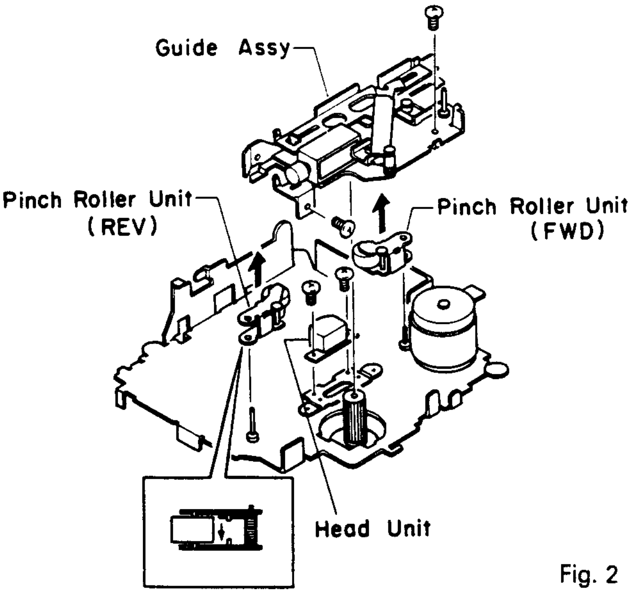
Guide Assy
Pinch Roller Unit (REV)
Pinch Roller Unit (FWD)
Head Unit

Fig. 2

• Dismounting the Gear (Reel Base)

1. Remove the two screws, and then remove the cover.
2. Remove the collar, and then remove the spring and gear. When removing the collar be careful not to damage the claw on the inside of the collar.

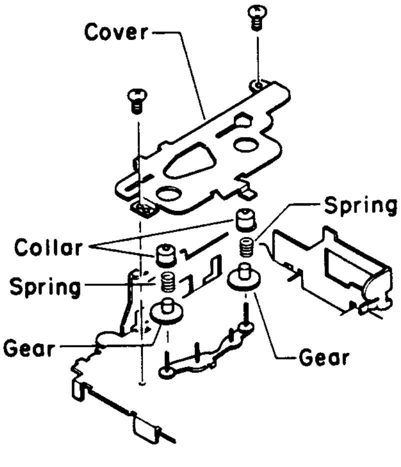
Cover
Spring
Collar
Spring
Gear
Gear

Fig. 3

• Dismounting the Flywheels

1. Remove the two screws, and then remove the cover.
2. Take off E washer. Retain washer properly to ensure it doesn't get lost.
3. Remove the flywheels. Do not mistake the N and R flywheels.

• Dismounting the Motor Unit

1. Remove the two screw, and then remove motor unit.

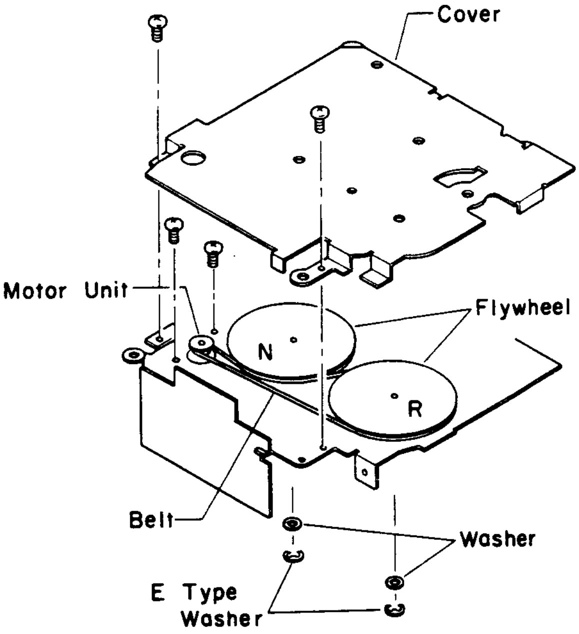
Cover
Motor Unit
Flywheel
N
R
Belt
Washer
E Type Washer

Fig. 4

2. ADJUSTMENT

2.1 AZIMUTH ADJUSTMENT

• To Adjust

1. Play "A" side of NCT-110 (10 kHz, −10 dB). Adjust each screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

2.2 TAPE SPEED ADJUSTMENT

• To Adjust

1. Reproduce NCT-111 (3 kHz, −10 dB). Adjust the semifixed resistor so that frequency counter shows 3,010 Hz (+80 Hz, −40 Hz).

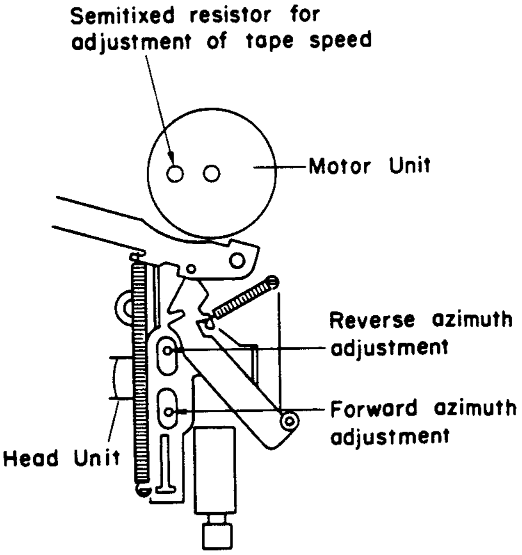
Semitixed resistor for adjustment of tape speed
Motor Unit
Reverse azimuth adjustment
Forward azimuth adjustment
Head Unit

Fig. 5

2.3 CHECK POINTS OF CASSETTE MECHANISM

Confirm the following items when replacing parts of the cassette mechanism.	■ Tape speed deviation: $3{,}000^{+90}_{-30}$ Hz (4.76cm/s $^{+3}_{-1}$ %) Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimun and maximum values. Measuring time shall be 5 – 6 seconds.	■ Wow and flutter: Less than 0.18% (WRMS) Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 – 6 seconds.
■ Fast forward and rewinding time: 95–115 seconds Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.	■ Winding torque: 37–63g•cm Using a cassette type torque meter (100 g•cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 – 6 seconds.	■ F.F. torque: 70–110g•cm Using a cassette type torque meter (120 g•cm), measure the value when the tape stops in the F.F. mode.
■ REW torque: 70–110g•cm Using a cassette type torque meter (120 g•cm), measure the value when the tape stops in the REW mode.	■ Back tension torque: 0.5–5 kg After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.	■ Cassette loading force: Less than 0.5 kg Push the center of the cassette and measure the force with a tension meter (3 kg).

3. MECHANISM DESCRIPTION

- **Parts Location**

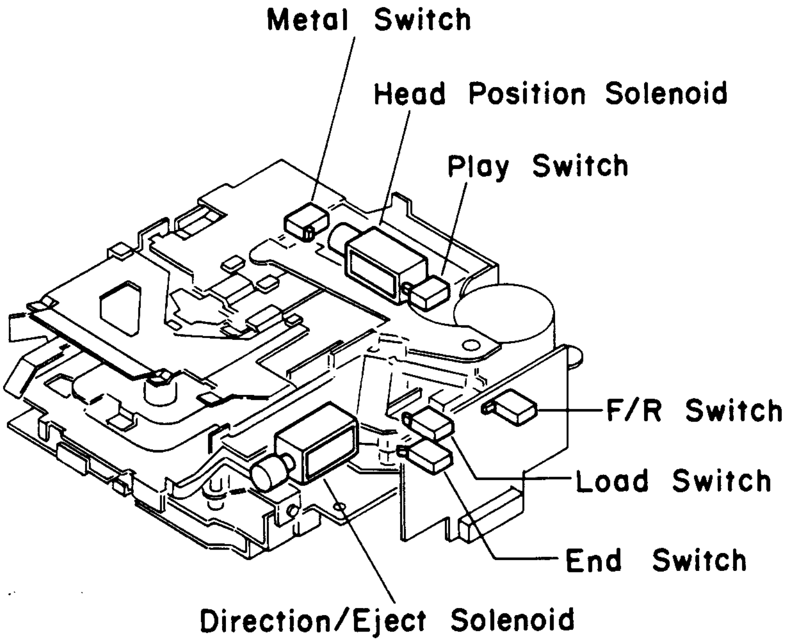
Metal Switch
Head Position Solenoid
Play Switch
F/R Switch
Load Switch
End Switch
Direction/Eject Solenoid

Fig. 6

- **Switch Mode**

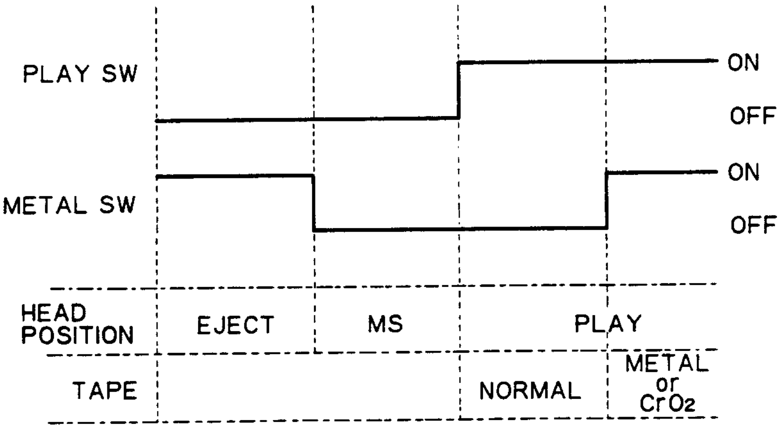

Fig. 7

• ATSC Operation

(1) Loading of a tape cassette causes an arm unit to turn, which causes the load switch to turn ON. With the load switch ON, a motor runs to cause all gears other than FF/REW idler gears to mesh and forward and reverse idler gears rotate in the respective play direction. Now the ATSC state is obtained (Figs. 8 and 9).

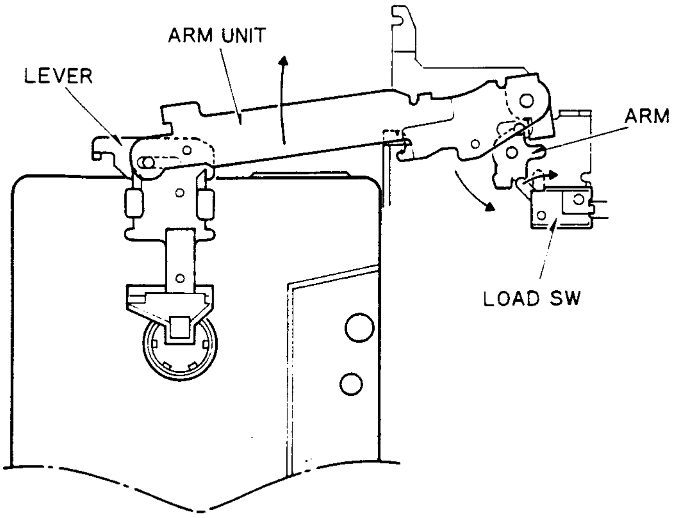
ARM UNIT
LEVER
ARM
LOAD SW

Fig. 8

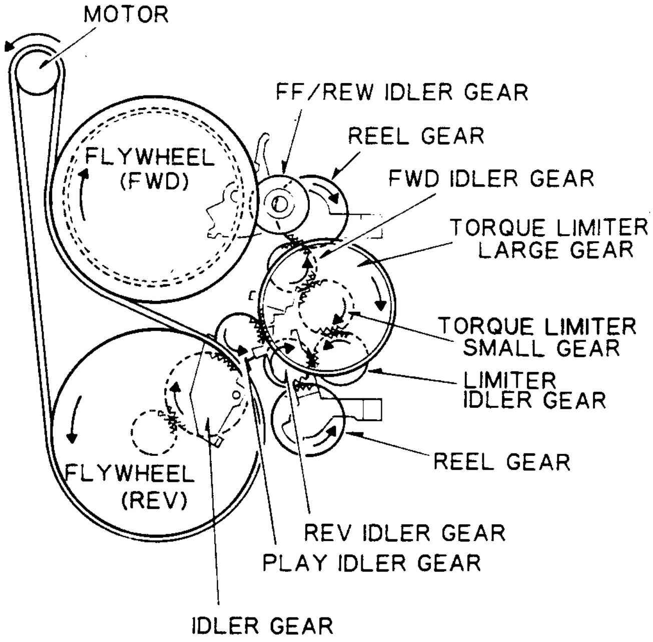
MOTOR
FF/REW IDLER GEAR
REEL GEAR
FLYWHEEL (FWD)
FWD IDLER GEAR
TORQUE LIMITER LARGE GEAR
TORQUE LIMITER SMALL GEAR
LIMITER IDLER GEAR
REEL GEAR
FLYWHEEL (REV)
REV IDLER GEAR
PLAY IDLER GEAR
IDLER GEAR

Fig. 9

• Sensing Operation

(1) Sensing arm (felt) and torque limiter bush are held together by means of a sensing arm spring.
The felt slides with the torque limiter bush side to keep Point A as a fulcrum at all times while the sensing arm moves along a cam of sensing cam gear because the arm tries to turn counterclockwise. (Fig. 10)

(2) the torque limiter bush stops rotation at ATSC or tape end, and a pin of sensing arm is pushed toward the outermost side by the sensing cam gear.
Frictional force between the felt and bush helps the sensing arm holding its position. (Fig. 11)

(3) When the sensing cam gear is turned further, with the sensing arm held in a state shown in Fig. 11, the sensing arm pin is caught by a hook of the cam gear. (Fig.12)

(4) The sensing cam gear turns further from the state shown in Fig. 12, and the sensing arm moves to turn ON the sensing switch. (Fig. 13)

(5) With the sensing switch ON, the sensing cam gear turns further to release the sensing arm pin from the hook.
The pin returns to an original position under a force of the sensing arm spring. (Fig. 14)

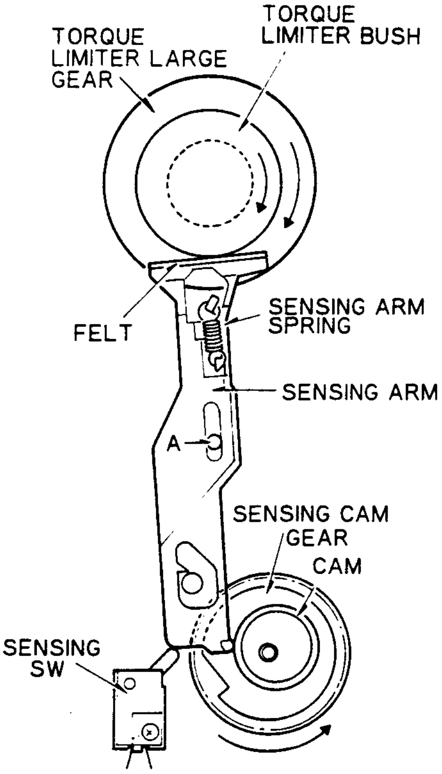
TORQUE LIMITER LARGE GEAR
TORQUE LIMITER BUSH
FELT
SENSING ARM SPRING
SENSING ARM
A
SENSING CAM GEAR
CAM
SENSING SW

Fig. 10

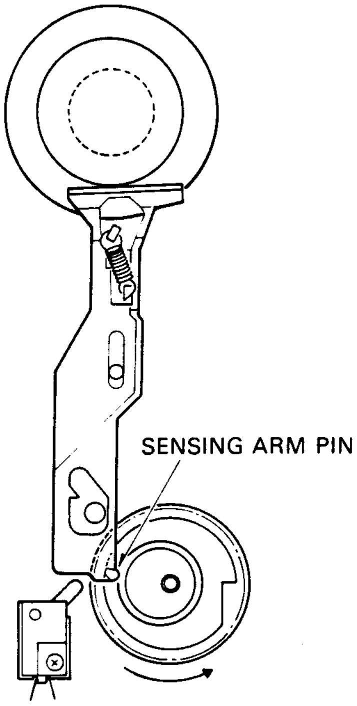
SENSING ARM PIN

Fig. 11

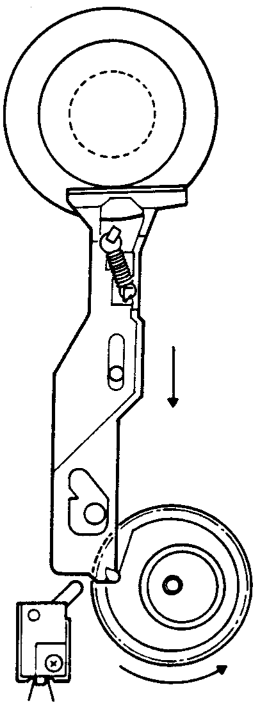

Fig. 12

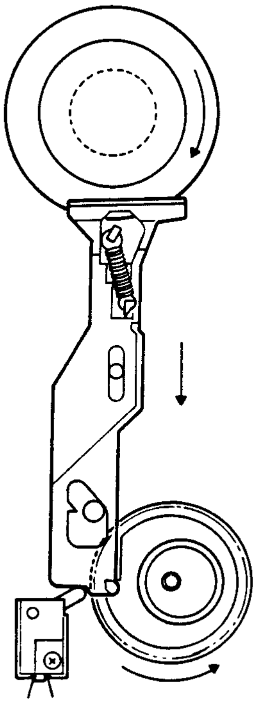

Fig. 13

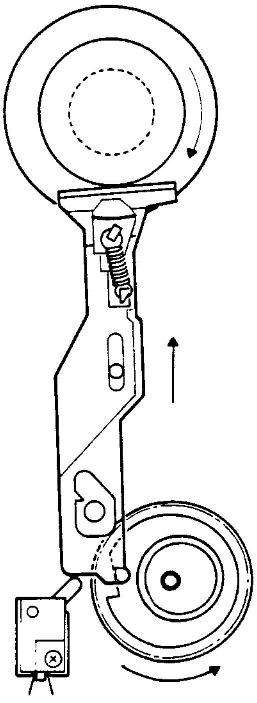

Fig. 14

- **Heading Operation**

(1) A heading solenoid performs attraction in the A direction, causing a lock arm to turn clockwise via L arm, solenoid lever, and arm (A). The cam gear is unlocked. Notch of the cam gear meshes with the second-stage gear for counter-clockwise rotation.
The arm (B) is driven clockwise to begin heading operation. In this heading operation, the arm (B) turns clockwise to cause a lever to move in the B direction.
A head base, which is connected with the lever via spring, operates simultaneously with spring.
(Fig. 15)

(2) Fig. 16 shows the state at end of heading operation.
The cam gear rotates to a full limit and the lock arm locks the cam gear. This locking is made to prevent the head base to move backward due to entry of the play lock arm while heading operation is under way.

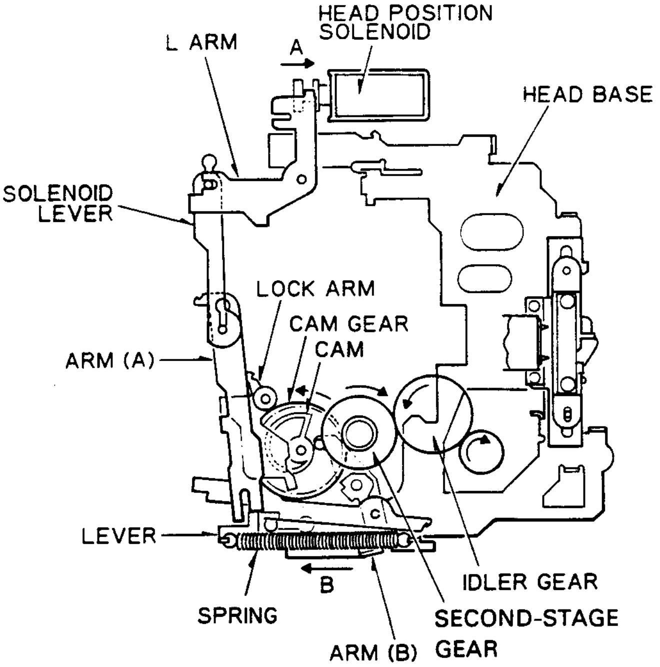
HEAD POSITION SOLENOID
L ARM
A
HEAD BASE
SOLENOID LEVER
LOCK ARM
CAM GEAR
CAM
ARM (A)
LEVER
B
IDLER GEAR
SPRING
SECOND-STAGE GEAR
ARM (B)

Fig. 15

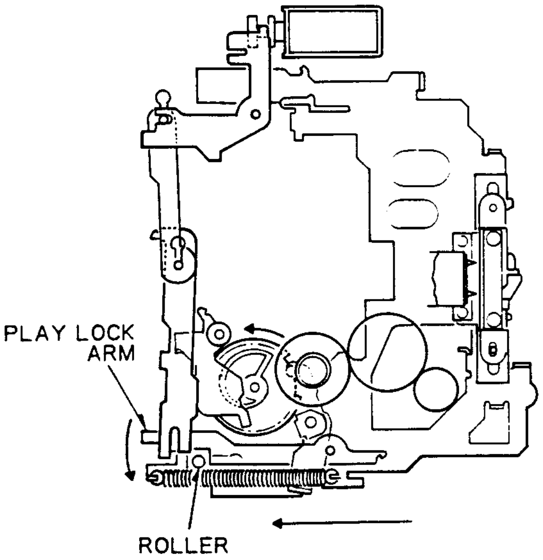
PLAY LOCK ARM
ROLLER

Fig. 16

• Playing Operation

(1) FWD play is obtained when the REV idler gear is released from the limiter idler gear. (Fig. 17)
REV play is obtained when the FWD idler gear is released from the torque limiter small gear. (Fig. 18)

FWD PLAY

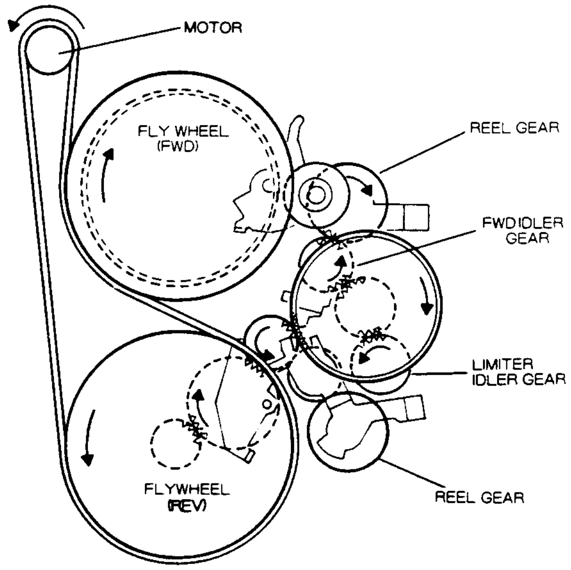
MOTOR
FLY WHEEL (FWD)
REEL GEAR
FWD IDLER GEAR
LIMITER IDLER GEAR
REEL GEAR
FLYWHEEL (REV)

Fig. 17

REV PLAY

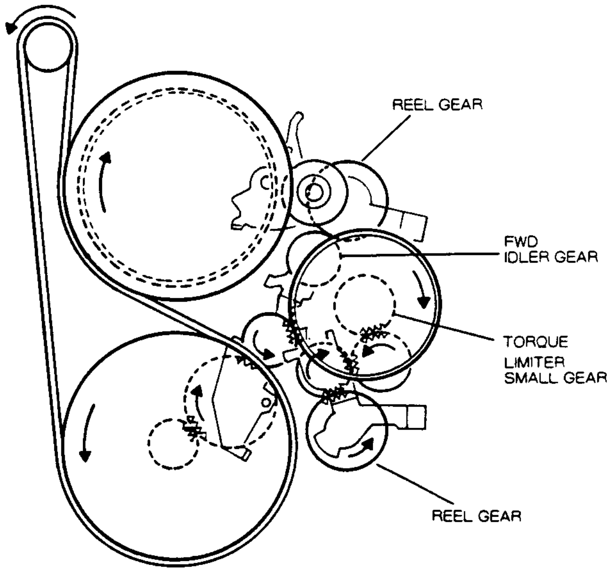
REEL GEAR
FWD IDLER GEAR
TORQUE LIMITER SMALL GEAR
REEL GEAR

Fig. 18

- **Direction Change**

(1) To change the tape running direction, pull the DIR (EJ) solenoid in the A direction to press the lock arm via solenoid arm to unlock the F/R gear.
Notch meshes to cause counterclockwise rotation to move the F/R lever to the right.
The F/R lever moves the F/R slide lever and F/R arm.
The F/R slide lever performs pinch roller changeover by cam and F/R switch changeover (FWD→ ON, REV→OFF).
The F/R arm moves FWD and REV idler plates via the F/R control lever in order to achieve changeover between FWD and REV idler gears.
Note that the F/R arm is connected with a head base, and the roller performs FWD and REV idler gears changeover because it is in the B section of F/R arm when the head is at PLAY or MS.
As the roller is in the C section of the F/R arm when the head is at the release (EJ) position, no changeover is made. In this state, both idler gears of FWD and REV mesh with each other. (Figs. 19 and 20)

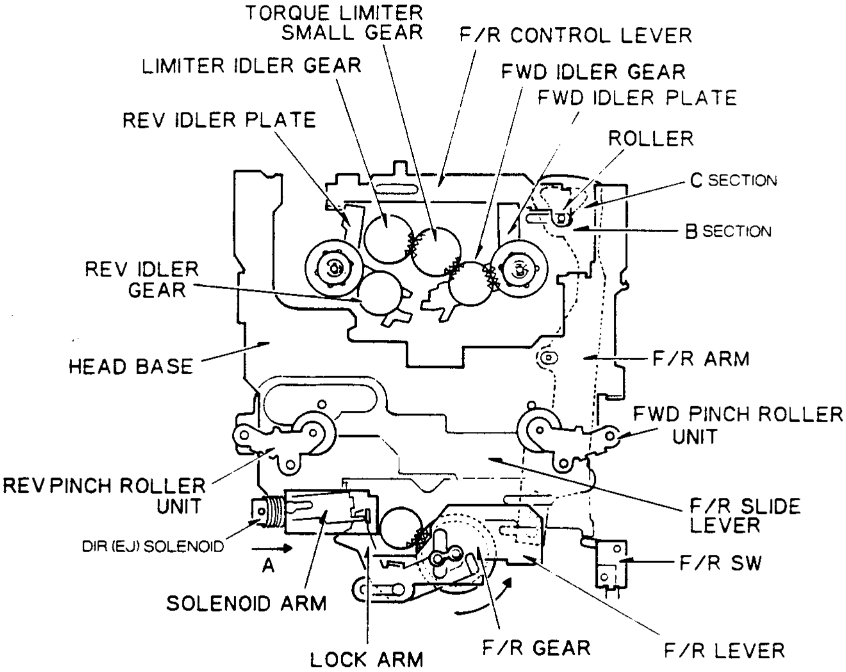
TORQUE LIMITER SMALL GEAR
F/R CONTROL LEVER
LIMITER IDLER GEAR
FWD IDLER GEAR
FWD IDLER PLATE
REV IDLER PLATE
ROLLER
C SECTION
B SECTION
REV IDLER GEAR
HEAD BASE
F/R ARM
FWD PINCH ROLLER UNIT
REV PINCH ROLLER UNIT
F/R SLIDE LEVER
DIR (EJ) SOLENOID
A
F/R SW
SOLENOID ARM
LOCK ARM
F/R GEAR
F/R LEVER

Fig. 19

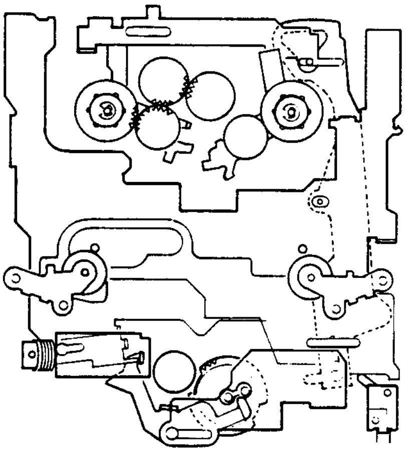

Fig. 20

• Head Position

(1) Fig. 21 shows the play state. The heading solenoid is moved in the A direction from the play state to release the play lock arm via L arm, solenoid lever and arm (A).
The head base moves backward until locked with an MS lock arm under a force of return spring and enters the MS state.
The head base rotates the lock arm at a head base bend section during return, thereby unlocking the FF/REW arm.
The FF/REW arm turns counterclockwise and stops at a specified position, allowing the FF/REW idler gear to mesh with flywheel and torque limiter.
The play idler arm turns clockwise to release the play idler gear from the torque limiter. (Fig. 22)

· PLAY

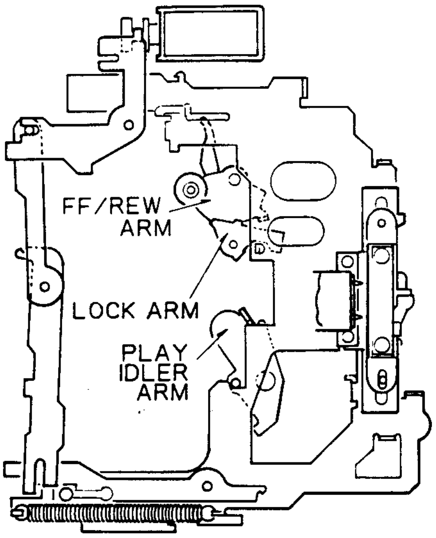
FF/REW
ARM
LOCK ARM
PLAY
IDLER
ARM

Fig. 21

· MS (FF/REW)

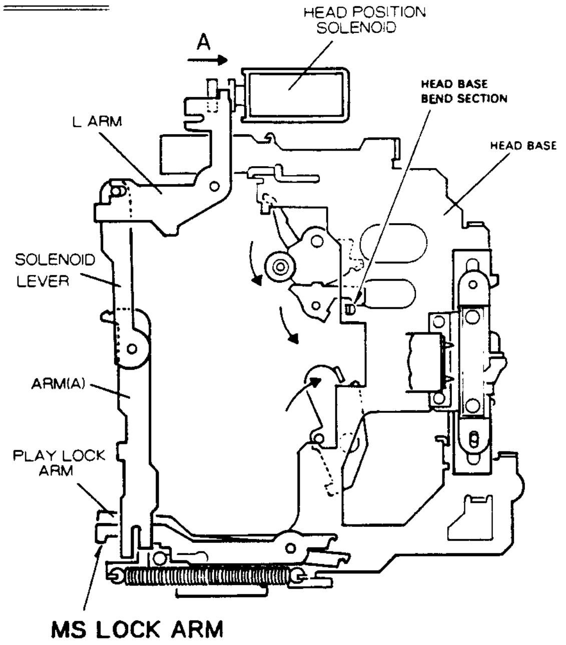
HEAD POSITION
SOLENOID
A
HEAD BASE
BEND SECTION
HEAD BASE
L ARM
SOLENOID
LEVER
ARM(A)
PLAY LOCK
ARM
MS LOCK ARM

Fig. 22

(2) The heading solenoid is moved in the A direction from the MS state to release the MS lock arm via L arm, solenoid lever, and arm (A).
The head base returns to the release position under a force of return spring.
The head base pushes back the FF/REW arm during return, releasing the FF/REW idler gear from the torque limiter.
The play idler arm is rotated counterclockwise by a cam of the head base to mesh the play idler gear with the torque limiter. (Fig. 23)

· RELEASE (EJ)

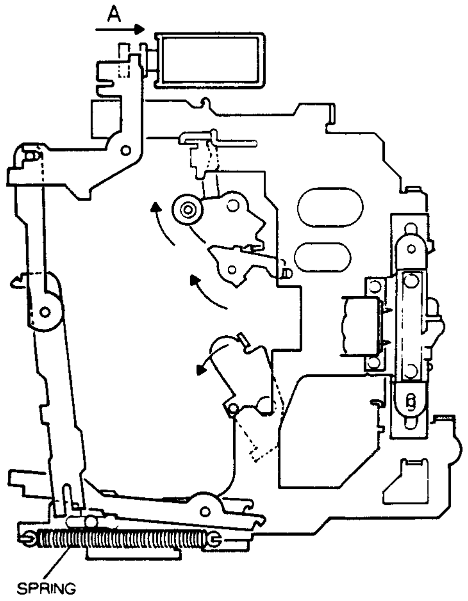

Fig. 23

• FF/REW Operation

(1) The play idler gear is released from the torque limiter large gear, and the FF/REW idler gear meshes.
When the REV idler gear is released, the FF state is obtained. The REW state is obtained when the FWD idler gear is released. (The state is opposite between FWD (PLAY) and REV (Reverse) in both cases.)
There are two (upper and lower) torque limiter large gears. Both two FF/REW idler gears mesh simultaneously during FF/REW to generate large torque. (Only one gear meshes during play.) (Figs. 24 and 25)

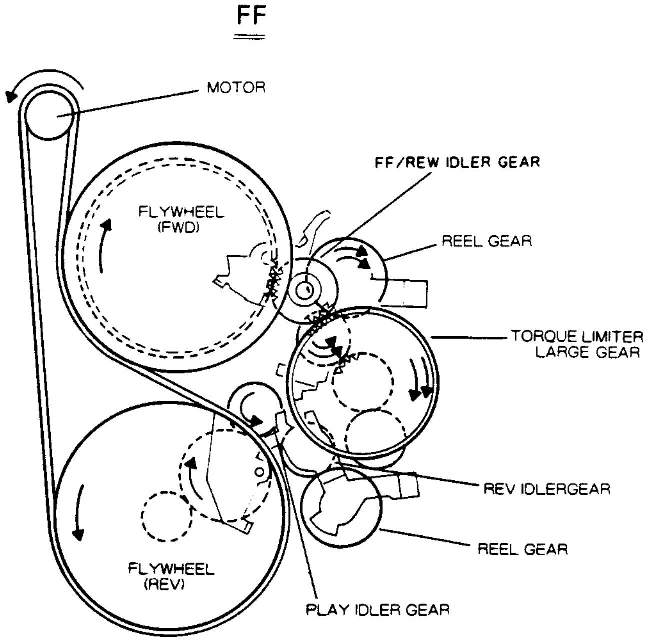
FF
MOTOR
FF/REW IDLER GEAR
REEL GEAR
FLYWHEEL (FWD)
TORQUE LIMITER LARGE GEAR
REV IDLERGEAR
REEL GEAR
FLYWHEEL (REV)
PLAY IDLER GEAR

Fig. 24

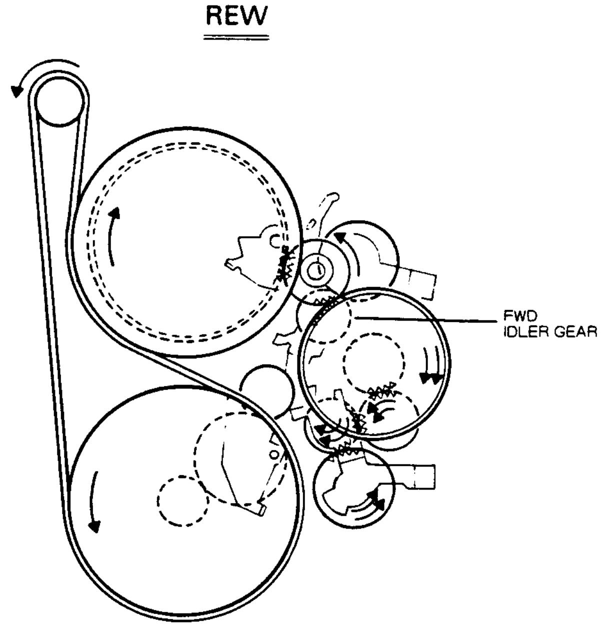
REW
FWD IDLER GEAR

Fig. 25

- **Eject Operation**

(1) The EJ (DIR) solenoid performs attraction to operate the lock arm via solenoid arm, unlocking gear.
The gear then rotates counterclockwise to contact the lever (B) which is moved to the right.
The lever (A) is connected with the lever (B) via spring, and moves simultaneously to the right. A cam of the lever (A) pushes up a cassette arm and the lever (C) enters below a cassette arm roller to maintain the push-up height. (Fig. 26 ~ 28)

(2) Upon completion of push-up of a tape cassette, the gear (B) pushes the lever (D) by roller to move it to the left. The lever (D) is connected with an arm unit via spring (D) and pushed out the tape cassette. (Figs. 29 and 30)

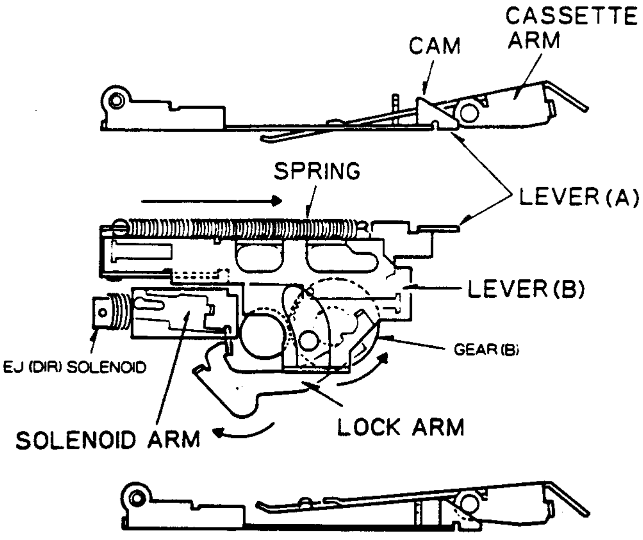
CASSETTE ARM
CAM
SPRING
LEVER (A)
LEVER (B)
GEAR (B)
EJ (DIR) SOLENOID
SOLENOID ARM
LOCK ARM

Fig. 26

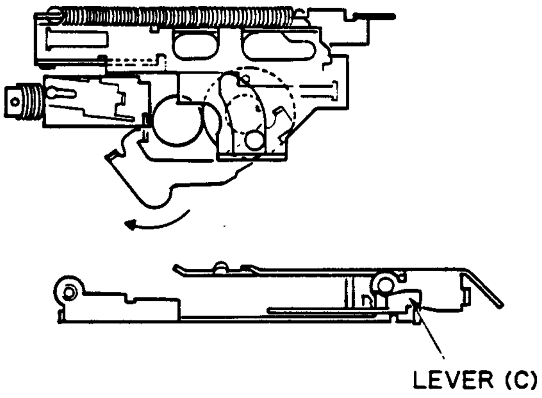

Fig. 27

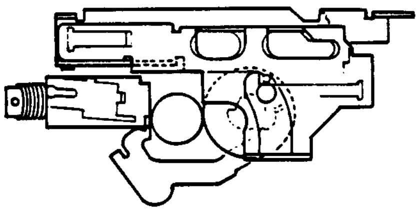

Fig. 28

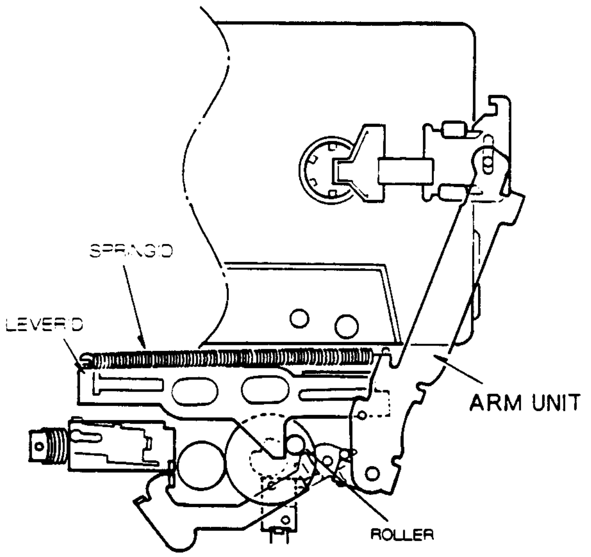
SPRING D
LEVER D
ARM UNIT
ROLLER

Fig. 29

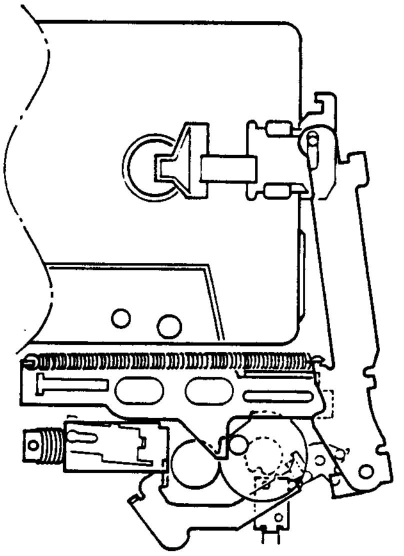

Fig. 30